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DOMINION OF CANADA

FOURTEENTH  
ANNUAL REPORT  
OF THE  
DEPARTMENT OF FISHERIES  
SEVENTY-SEVENTH ANNUAL FISHERIES  
REPORT OF THE DOMINION

---

FOR THE YEAR

1943-44



OTTAWA  
EDMOND CLOUTIER  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
1945

DEPARTMENT OF COMMERCE

COMMISSIONER

# ANNUAL REPORT

OF THE

## DEPARTMENT OF FISHERIES

REPORT MADE AT ANNUAL MEETING  
OF THE COMMISSION

FOR THE YEAR

1903-04



PRINTED BY THE GOVERNMENT OF CANADA  
OTTAWA, 1904



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*To His Excellency Major-General the Right Honourable the Earl of Athlone,  
K.G., P.C., G.C.B., G.M.M.G., G.C.V.O., D.S.O., A.D.C., Governor  
General and Commander-in-Chief of the Dominion of Canada*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour herewith, for the information of Your Excellency and the Parliament of Canada, to present the Fourteenth Annual Report of the Department of Fisheries, being the Seventy-seventh Annual Fisheries Report for the Dominion.

I have the honour to be,

Your Excellency's most obedient servant,

ERNEST BERTRAND,

*Minister of Fisheries.*

DEPARTMENT OF FISHERIES,  
Ottawa, May 31, 1944.



## REPORT OF THE DEPUTY MINISTER

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To the Hon. ERNEST BERTRAND, M.P.,  
Minister of Fisheries.

SIR,—I have the honour to submit the Fourteenth Annual Report of the Department of Fisheries, which covers the fiscal year 1943-44 and is the Seventy-seventh Annual Report on the Fisheries of the Dominion.

Following the same course as has been taken for several years past, for reasons of economy, the present report has been kept within smaller limits than the reports of pre-war times. The condensation has been in lessened reference to matters of detail.

The report refers to such matters as the results of commercial fishing operations in the calendar year 1943, exportation of fisheries products during the year, the work of the important international commissions concerned, respectively, with the Pacific halibut fishery and the Fraser River sockeye fishery, Canada's return from sealing operations at the Pribilof Islands under the Dominion's agreement with the United States, and so on. Accompanying the report are appendices dealing in more or less detail with several branches of the Department's work. Included among these appendices are:—

The Reports of the Chief Supervisors of Fisheries.

A Report on Fish Culture Work of the Department.

A Report on Oyster Culture and the Further Development of Oyster Farming.

The Report of the Fisheries Engineer.

Reports as to the Work of the Fish Inspection Laboratories.

The Annual Financial Statement.

### \*FISHERIES RESULTS IN THE CALENDAR YEAR 1943

Reference to the results of 1943 operations in a number of sea fisheries will be found, in some detail, in Appendices 1 and 2. The appendices do not deal with production from the commercial freshwater fisheries, since nearly all of those fisheries, including those of greatest importance, are administered by provincial authorities, not by the Department, but statistical data relative to the results of both sea and freshwater operations will be found in *Fisheries Statistics of Canada, 1943*. The annual fisheries statistical report for Canada is prepared by the Department and the Dominion Bureau of Statistics, jointly, with the collaboration of provincial departments of government having to do with fisheries matters.

*Investment and Producing Personnel.*—Working force employed in turning out the production referred to in the following review was very slightly larger than the personnel engaged in 1942 fisheries operations—a change which was

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\* Figures in this review are stated, in general, in round numbers; detailed figures will be found in *Fisheries Statistics of Canada, 1943*.



relatively unimportant, so far as actual increase was concerned, but was of some interest as showing a reversal of the employment trend seen in the preceding war years. All told, 77,527 people were at work in 1943, as compared with 76,956 in the year before. The small increase was divided fairly equally between fishermen and plant employees. The former numbered 61,627 and plant workers 15,900 but so far as fishermen were concerned the net increase was in freshwater working force. Sea fishermen, 47,554 in 1942, dropped to 46,068.

Vessels, boats, gear, etc., used in catching and landing fish were valued at \$31,042,500, using round figures, and the processing plants represented an investment of a little more than \$30,741,000. Total investment was thus about \$61,783,000, a decrease of something over \$848,000. There was an increase of \$1,964,000 in the value of vessels, etc., but plant figures decreased by \$2,812,000.

*Production Totals.*—Production from the Dominion's commercial fisheries in 1943 was greater both in volume and marketed value than in 1942, and on the value side an increase of \$12,000,000 brought the year's total to approximately \$87,100,000—much the highest figure in the history of the fisheries. Landed value of the catch—that is, the value to the fishermen as landed—was over \$48,800,000, or \$7,000,000 and more above the total for 1942. Landed and marketed values alike increased everywhere except in British Columbia, where reduction in salmon catch was the main adverse factor, and in the Yukon Territory, where, at best, production never runs into more than small figures.

So far as volume of landings is concerned, there was decrease in British Columbia and the Yukon, and a small reduction in Manitoba, but gains were general in other parts of the country with the net result that for the Dominion as a whole the catch was 1,234,000,000 pounds as against 1,206,000,000 in the preceding year. As already indicated, the British Columbia salmon catch was much smaller than in 1942; that decrease and a drop in herring landings explain the lessened production total for the Pacific coast. Total sea fisheries catch exceeded 1,143,000,000 pounds, and total landings from the inland fisheries were something over 91,000,000 pounds.

Sea fisheries production represented, in round figures, \$74,500,000 of the marketed value total, and freshwater production more than \$12,100,000. In the one case there was an increase of over \$8,500,000, as compared with 1942 return, and in the other case the increase exceeded \$3,500,000. The largest gain in marketed value, over \$7,500,000, was in Nova Scotia, with New Brunswick standing second with an increase of \$4,100,000. In Prince Edward Island there was a gain of roughly \$1,200,000 and in Quebec more than \$1,600,000. On the other hand the marketed value of the catch taken by British Columbia fishermen, a little less than \$32,500,000, showed a reduction of well over \$5,500,000. In the freshwater fisheries Ontario led in marketed value aggregate with Manitoba second, Saskatchewan third, Quebec fourth, and Alberta next. New Brunswick and the Yukon are the other parts of the Dominion with commercial freshwater fisheries but their production is small. Marketed value for Ontario showed an increase of nearly \$1,160,000 and in Manitoba the increase was slightly less than a million. Relatively, however, Saskatchewan made the best showing, so far as rise in marketed value is concerned. In 1942 the products of the Saskatchewan fisheries were worth some \$585,000 but in 1943 the figure went beyond \$1,150,000, or a gain of not far short of 100 per cent. The whitefish, trout and pickerel fisheries were mainly responsible for the Saskatchewan gain.

Marketed value figures for 1943, by provinces, are given in the following table, with returns from the sea and inland fisheries shown separately:—

## ERRATA

Page 4, Production Totals section:-Para. 1, Line 3, for \$12,000,000 read \$10,800,000: Line 4, for \$87,100,000 read \$85,900,000. Para. 3, Line 1, for \$74,500,000 read \$73,250,000: Line 2, for \$12,100,000 read \$12,600,000: Line 3, for \$8,500,000 read \$8,300,000: Line 5, for \$7,500,000 read \$6,400,000.

Page 5, Table:-For \$22,813,000 in the Nova Scotia entries read \$21,726,800: for \$5,159,100 in the Quebec "Sea" column read \$5,012,200, and for the Quebec total read \$5,817,500.



	Sea (a)	Inland (a)	Totals (a)
	\$	\$	\$
Nova Scotia.....	22,813,000		22,813,000
New Brunswick.....	11,169,800	32,600	11,202,400
Prince Edward Island.....	2,860,900		2,860,900
Quebec.....	5,159,100	805,300	5,964,400
Ontario.....		5,292,200	5,292,200
Manitoba.....		4,564,500	4,564,500
Saskatchewan.....		1,154,500	1,154,500
Alberta.....		795,000	795,000
British Columbia.....	32,477,900		32,477,900
Yukon.....		2,495	2,495

(a) Odd figures dropped.

Figures for the Maritime Provinces, British Columbia, and the Yukon based on reports collected by the Department of Fisheries; other figures obtained through provincial authorities.

British Columbia's salmon fishery continued to rank well ahead of any other fishery in the country in marketed value return, notwithstanding the large decrease in production already noted. The value total decreased by some \$7,600,000 and amounted, in round figures, to \$14,740,000. The drop in catch was about 40,000,000 pounds and the year's landings reached only a little more than 121,420,000 pounds. With fewer salmon taken, there was also reduction, of course, in salmon cannery output and the pack was 1,258,600 cases, as against nearly 1,814,300 cases in 1942. In this connection, however, it may be noted that the output of canned sockeye in 1942 had been the largest in nearly thirty years and total salmon pack had been swelled accordingly. Out of the 1943 total about 950,000 cases, valued at \$8,910,000, were supplied to Great Britain under one of the food supply agreements between Ottawa and London.

Since 1940 the cod fishery and the sea herring fishery have alternated in ranking next to the Pacific salmon fishery in marketed value return, with the cod fishery outstripping the other in 1943. Cod catch for the year—all but a very small part of it taken by Atlantic Coast fishermen—exceeded 215,000,000 pounds, as compared with something over 194,200,000 pounds in 1942, and its marketed value was about \$12,700,000—an increase of \$2,700,000. The value of the sea herring catch likewise increased but by less than half as much as the cod return and amounted in all to a little less than \$11,890,000. The gain in herring value came about as a result of firmer prices and the catch figures were smaller than in the preceding year or 318,720,000 pounds as against more than 358,150,000. More than half of the landings were made by British Columbia fishermen.

Canned fresh herring are one of the foods which Great Britain has needed from Canada in large quantity during the war years. Production in 1943 was not as large as in 1942, though substantially larger than 1941 output and very many times larger than the annual pack of pre-war. All told, 1,418,000 cases were put up, much the greater part of them in British Columbia, as compared with 1,642,000 cases in 1942. Nearly all of these canned herring were supplied to the United Kingdom.

In the inland fisheries whitefish, pickerel, lake trout, blue pickerel, and saugers were the ranking species, so far as 1943 marketed value return were concerned. Whitefish marketed value was about \$3,600,000, an increase of something more than \$500,000, as compared with 1942 return. Pickerel catch was worth \$2,100,000, a gain of roughly \$650,000, and lake trout production was nearly \$1,250,000 or \$200,000 and more above the 1942 figures. Blue pickerel landings—all of them reported by Ontario—more than doubled in marketed value—\$1,391,000. In the case of saugers, on the other hand, a decrease of \$182,000 brought the year's value total down to \$1,056,000.



## SEA FISHERIES

As will be seen from the next table, the year's landings from the sea fisheries increased in each Atlantic province but the decrease in British Columbia reduced the net gain to less than 20,000,000 pounds, with total catch amounting to 1,143,200,000 pounds. The table shows the sea catch, by provinces, using round figures in each instance.

	1943	1942
	Cwts.	Cwts.
Nova Scotia.....	2,975,200	2,551,300
New Brunswick.....	1,808,100	1,615,300
Prince Edward Island.....	332,400	292,400
Quebec.....	1,085,800	1,062,600
British Columbia.....	5,230,500	5,711,400
Totals.....	11,432,000	11,233,000

It has already been said that decrease in aggregate landings in British Columbia was due to reduction in salmon and herring catches. In general, on the other hand, the landings of other Pacific fish increased, including the landings from the important halibut and pilchard fisheries, though combined gains were insufficient to offset the salmon and herring decreases. Halibut catch was not far short of 12,700,000 pounds, as against something more than 11,000,000 pounds in 1942, and its marketed value, \$2,761,000, showed a gain of over half a million dollars. Nearly 177,500,000 pounds of pilchards were taken, with a value of over \$2,750,000 on the market, as compared with less than 131,800,000 pounds and \$2,016,000.

The outstanding feature of the year's Pacific Coast operations, and outstanding, indeed, in Dominion operations, was the continued expansion of the business in fish livers and vitamin oils. Only a few years ago there was nothing of the kind in connection with British Columbia fisheries but development has recently gone ahead fast and on a large scale. In this connection it is properly to be said that a great share of the credit for what has been accomplished belongs to the Fisheries Research Board of Canada. The board has done exceedingly valuable work in its studies of fish livers as sources of vitamin oils, work which has not been confined to the Pacific Coast, of course, though it happens that because of certain natural conditions the main expansion in vitamin oil production has taken place in that part of the Dominion. As a result of the board's investigations and experiments in connection with liver oils some fish have taken on value which had none before and the value of others has increased. Perhaps the most notable example in this regard is the case of the Pacific dogfish, which was at one time regarded as chiefly a "nuisance" fish but later took on some limited value as the raw material for the manufacture of fish meal and industrial oil. In 1943 the landings of dogfish livers brought the British Columbia fishermen nearly \$1,180,000 in landed value and the vitamin oil produced from them had a marketed value of slightly more than \$2,028,000.

All told, the landings of fish livers on the Pacific Coast in 1943 exceeded 5,500,000 pounds. Total provincial production of vitamin fish oils, including some oils made from viscera as well as the liver oils, was 4,057,000 pounds, an increase of over a million pounds, as compared with 1942 output. Marketed value was \$2,690,000, an increase of almost \$830,000. Output of oils for

industrial purposes (e.g., herring and pilchard oil) added another \$1,851,500 to provincial fish oil return for the year.

On the Atlantic coast the cod fishery kept well ahead in volume and value of production. Cod totals for the year increased all 'round—catch, landed value, marketed value. Landings, 213,905,000 pounds, were greater by nearly 20,350,000 pounds than in 1942. An increase of over \$350,000 brought fishermen's landed value return to more than \$5,920,000. Marketed value ran close to \$12,600,000, a gain of about \$2,675,000.

Lobster figures were likewise larger than in the preceding year, as will be seen from a later reference to this fishery. Atlantic herring landings, roughly 135,925,000 pounds, increased by more than 10,000,000 and total marketed value, something over \$4,000,000, by well over \$1,500,000, although the pack of canned round herring, 99,000 cases, was reduced by several thousand cases. Sardine catch, practically all of it taken in southwestern New Brunswick, went beyond 77,800,000 pounds, a sharp rise, and the pack of canned sardines was 545,500 cases, as compared with less than 407,500 in 1942. The mackerel fishery yielded a catch of more than 37,000,000 pounds, which meant an increase of more than 6,700,000 pounds, and its marketed value, about \$2,360,000, increased by nearly 80 per cent or by more than \$1,000,000. In this fishery the year saw a great increase in cannery output with the pack exceeding 51,300 cases, as against slightly less than 14,000.

In the lobster fishery, entirely an Atlantic fishery, the year was marked by a catch gain of more than 2,100,000 pounds and a marketed value increase of \$3,600,000. The catch gain was in Nova Scotia and Quebec, mainly the former province. There was an increase of nearly a million dollars in the return from canning operations but a still greater increase, \$2,100,000 and more, in the business in lobsters shipped alive. Cannery output, 62,400 cases, was about a thousand cases smaller than in 1942, but the shipments of lobsters in the shell exceeded 16,700,000 pounds as compared with less than 13,700,000 pounds. The following table shows, by provinces, the 1943 lobster catch, quantity shipped in shell, the pack of canned lobster and the pack of tomalley, with marketed values in each case:—

	Catch		Shipped in Shell		Canned		Tomalley	
	Cwts.	Marketed Value	Cwts.	Marketed Value	Cases	Marketed Value	Cases	Marketed Value
		\$		\$		\$		\$
Nova Scotia, .....	154,134	4,292,825	108,779	2,700,434	20,863	938,549	1,713	34,799
New Brunswick, ...	68,545	2,813,387	48,869	1,571,241	17,427	836,993	2,196	60,997
Prince Edward Island, .....	59,719	1,165,008	3,079	82,632	18,592	879,156	2,456	71,125
Quebec, .....	19,085	423,287	6,697	126,996	5,581	254,110	303	9,767
Totals, ....	301,483	8,694,507	167,424	4,481,303	62,463	2,908,808	6,668	176,688

#### FRESHWATER FISHERIES RESULTS

Commercial landings from the Dominion's inland fishing waters were nearly 82,400 hundredweights greater in 1943 than in 1942 and there was substantial increase both in the landed value and the marketed value of the catch. All told, 910,750 hundredweights of fish were taken, as against slightly less than

828,400 hundredweights in the preceding year. The return to the fishermen in landed value was \$10,138,000 and the marketed value total was a trifle under \$12,646,800, which meant an increase of over \$2,892,000 in the one case and over \$3,507,000 in the other case.

The net gain in catch flowed from operations in Quebec, Ontario, Saskatchewan, and Alberta, with the greatest increase taking place in Ontario though, relatively, Saskatchewan did even better than Ontario in catch gain. Both in New Brunswick and the Yukon Territory the catch fell off, but those areas are small producers at best. (New Brunswick, of course, also has important sea fisheries). In Manitoba there was a trifling decrease.

So far as value return from the year's operations is concerned, however, Manitoba's figures were well above those of 1942, notwithstanding that provincial catch showed no gain. As landed, the Manitoba catch was worth over \$3,427,600, a gain of more than \$700,500. Marketed value went beyond \$4,564,500, the greatest return in the history of the province and nearly \$987,000 above the total for the year before.

Similarly, in Ontario, Saskatchewan, and Alberta the marketed value totals left all previous figures well behind. Ontario's output was worth more than \$5,292,000 on the market, the Saskatchewan catch \$1,154,500, and marketed value in Alberta amounted to \$795,000. Quebec's sea fisheries outrank the inland fisheries of the province in importance but in Quebec, as in Ontario and the Prairie Provinces, 1943, freshwater marketed value showed sharp gain.

Freshwater catch, by provinces; was as follows:—

	Cwts.
New Brunswick .....	7,096
Quebec .....	67,621
Ontario .....	305,932
Manitoba .....	358,646
Saskatchewan .....	104,866
Alberta .....	66,431
Yukon Territory .....	159
Total .....	910,751

## FISHERIES EXPORTS

Shipments of fisheries products to other countries in 1943 were valued at \$60,313,000—using round figures here, as in other trade references— which meant an increase of 16 per cent or \$8,405,000 over the 1942 total. There was a decrease of \$2,177,000 in the goods charged to Great Britain but exports to the United States increased by \$9,552,000 and combined exports to countries other than Britain and the United States were greater by \$1,030,000 than in the preceding year. The decrease in the British case was due in the main to a reduction in the quantity of canned salmon supplied to the United Kingdom. That reduction, in turn, was due to the fact that the 1943 salmon pack in British Columbia was several hundred thousand cases smaller than the output had been in 1942. This drop in salmon pack was also chiefly responsible for reducing the total 1943 export of canned fish and shellfish to \$20,972,000, as compared with \$21,770,000 in the earlier year.

The export shipments of fresh and frozen fish during the year were valued in all at \$27,520,000. Except for shipments representing \$1,060,000 all of this trade in fresh and frozen products was done with the United States or, roughly,

\$26,450,000. In 1942 the figures for business with the United States were \$18,365,000.

Cured fish products valued at \$8,409,000 were exported, an increase of about \$1,110,000. Most of the exports in this classification consisted of salted fish supplied to a number of different countries under a Combined Food Board allocation plan in which Canada had joined.

Exportation of fish oils amounted to \$3,160,000, as compared with \$2,106,000 in the preceding year. The increase here was in sales to the United States which, in dollars and cents, were not far short of being three times as great as in 1942. Oil shipments to Great Britain were worth less than half as much as in 1942. Oil exportation was made up chiefly of cod liver oil, herring oil and pilchard oil. The cod liver oil sent abroad was more than twice as great, both in quantity and value, than in the year before or, on the value side, \$551,000 as against \$257,000.

### FISHING BOUNTY

Payments in fishing bounty on the Atlantic coast for the 1943 season were made to 736 vessels and their crews and to 8,929 fishing boats and their crews, and amounted in all to \$159,400.80. Payments to boat fishermen entitled to receive bounty were at the rate of \$7.40 each and to vessel fishermen \$7.90. Owners of boats measuring not less than 12 feet along the keel received \$1 per boat, and vessel payments were at the rate of \$1 per registered ton, with the maximum payment to the owner of any one vessel limited to \$81.

The payments of fishing bounty are made under authority of "An Act to Encourage the Developing of Deep-sea Fisheries and the Building of Fishing Vessels."

Details of the 1943 distribution are given in the following table.



1943-44

Province and County	Boats	Men	Amount	Vessels	Tons	Average Tons	Men	Amount	Total Amount
			\$ cts.					\$ cts.	\$ cts.
<i>Nova Scotia—</i>									
Annapolis.....	203	289	2,341 90						2,341 90
Antigonish.....	130	189	1,528 60						1,528 60
Cape Breton.....	235	375	3,010 30	56	785	14	205	2,404 60	5,414 90
Digby.....	286	501	3,993 60	37	480	13	80	1,112 00	5,105 60
Guysborough.....	485	751	6,042 50	40	507	13	121	1,463 10	7,505 60
Halifax.....	750	963	7,876 60	26	574	22	164	1,869 60	9,746 20
Inverness.....	210	560	4,354 00	10	112	11	58	570 20	4,924 20
Kings.....	1	1	8 40						8 40
Lunenburg.....	576	704	5,786 00	42	2,187	52	742	8,051 30	13,837 30
Pictou.....	18	26	210 40						210 40
Queens.....	125	200	1,605 30	14	175	13	39	483 30	2,088 60
Richmond.....	320	555	4,649 20	14	167	12	52	577 90	5,227 10
Shelburne.....	528	800	6,448 10	116	1,509	13	373	4,456 00	10,904 10
Victoria.....	237	375	3,012 00	13	154	12	43	493 70	3,505 70
Yarmouth.....	81	158	1,250 30	74	981	13	226	2,766 40	4,016 70
Hants.....	1	1	8 40						8 40
Totals.....	4,186	6,478	52,125 60	442	7,631	17	2,103	24,248 10	76,373 70
<i>New Brunswick—</i>									
Charlotte.....	139	300	2,359 20	24	299	12	77	907 40	3,266 60
Gloucester.....	434	838	6,635 90	128	2,420	19	524	6,559 70	13,195 60
Kent.....	157	266	2,125 50	16	178	11	52	589 00	2,714 50
Northumberland.....	40	116	898 40	16	176	11	40	492 00	1,390 40
Restigouche.....	4	7	55 80						55 80
Saint John.....	9	13	105 20						105 20
Westmoreland.....	10	20	158 00						158 00
Totals.....	793	1,560	12,338 00	184	3,073	17	693	8,548 10	20,886 10
<i>Prince Edward Island—</i>									
Kings.....	302	421	3,417 90	1	44	44	1	51 90	3,469 80
Prince.....	355	603	4,818 40	1	12	12	3	35 70	4,854 10
Queens.....	143	252	2,022 70						2,022 70
Totals.....	800	1,276	10,259 00	2	56	28	4	87 60	10,346 60
<i>Quebec—</i>									
Bonaventure.....	350	656	5,209 50	25	300	12	99	1,082 10	6,291 60
Gaspé.....	1,472	2,583	20,627 90	82	1,090	13	367	3,989 30	24,617 20
Matane.....	68	114	911 90						911 90
Saguenay.....	703	1,240	9,880 00						9,880 00
Magdalen Islands.....	557	1,279	10,014 30	1	32	32	6	79 40	10,093 70
Totals.....	3,150	5,872	46,643 60	108	1,422	13	472	5,150 80	51,794 40
Grand Total.....	8,929	15,186	121,366 20	736	12,182	17	3,272	38,034 60	159,400 80

NOTE.—A number of "late" claims amounting in all to \$1,682.40, and included in this statement, are for the season of 1942. As the basis of distribution for 1942 differed from that for 1943, a number of figures in the "amount" columns do not, as a result, balance with the number of claims paid.

## FISH CULTURE

Departmental fish culture operations were carried on in 1943 in the Maritime Provinces where the fisheries are mainly under federal administration. In all, 13 hatcheries were operated, 6 rearing stations, 6 salmon-retaining ponds, and several egg-collecting camps. The total distribution from these establishments was 26,279,870. Over 73 per cent of the stock distributed was in the fingerling and older stages. Details of the work of the fish culture branch for the year will be found in Appendix No. 3.

A report on oyster culture work is contained in Appendix No. 5.

## FUR SEAL RECEIPTS

Dominion receipts on fur seal account in the fiscal year 1943-44 amounted to \$219,260.71 or something more than \$7,100 above the 1942-43 total. The receipts were made up of Canada's share of the proceeds from skins marketed at St. Louis, Mo., by the United States Government, or \$97,200, in round figures,

and \$122,000, round numbers again, obtained as the net return from 3,068 skins sold by the Dominion through Montreal fur auctions under arrangements made by the Department of Fisheries. In both cases, of course, the skins involved were from Pribilof Island rookeries in Bering Sea. All sealing at the Pribilofs is in the hands of United States Government agencies but Canada is entitled to a share of the annual take. Because of certain war conditions, however, no skins were taken in 1942. Otherwise, the number of pelts available for sale at Montreal would have been larger. The 3,000-odd which were sold there were pelts remaining from the 1941 take.

In the 1943 sealing season at the Pribilofs 117,164 skins were taken, or nearly twice as many as usual. The explanation of the increase traces back to the war conditions just mentioned. The practice in Pribilof sealing is to take only surplus three-year-old male seals but when war factors prevented any sealing being done in 1942 the three-year-olds of that season went free. Consequently, when hunting could be resumed in 1943, male seals in both the three and four year classes were taken, and hence the jump in season's pelt total.

Canada's share of the year's skins—20 per cent of the total—was 23,433. In former days, before the fourpower Pelagic Sealing Treaty ceased to be operative in the latter part of 1941, the Dominion was entitled to only 15 per cent of the annual take but the percentage was increased under the Provisional Fur Seal Agreement made between Canada and the United States in 1942. Having regard to processing facilities currently available, a three-way plan is being followed in disposing of the 23,433 pelts. Some have been placed with the United States authorities for processing and marketing, along with skins belonging to the United States, and the net proceeds from their sale will accrue to Canada. Another lot are being shipped to London, England, for processing and in due course they will be brought back to the Dominion to be sold. The remainder, after being processed in St. Louis, will be marketed within Canada under Fisheries Department plans. In actual numbers, 9,999 pelts are being handled in the first of the three ways outlined, 9,454 go to London for finishing, and 3,980 make up the third lot. Dollars- and-cents returns from the sale of these several groups of skins do not enter into the accounts for the fiscal year 1943-44 but will come into later receipts. Processing and marketing the pelts from any season's take require some months.

## INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

During the season of 1943 the principal concern of the International Pacific Salmon Fisheries Commission has been with plans for the removal of obstructions to salmon migration in the Fraser River system. Scientific investigations carried out since 1938 have proved the existence of serious obstructions to the upstream migration of sockeye salmon at Hell's Gate, Bridge River Rapids, and at a number of other points. Remedial measures at Hell's Gate constitute the greatest single need since this is the first obstruction to be encountered by fish as they migrate upstream. Realizing that the removal of obstructions must precede other phases of the rehabilitation program for the river, the Commission has asked the governments of Canada and the United States for two million dollars with which to conduct special biological and engineering studies and remove important obstructions. Meantime temporary emergency measures have been taken in order to reduce losses until the permanent program can be completed. The emergency measures include a temporary fish ladder and a flume. In consequence of these measures, it is known that upstream migration has been considerably aided and that injuries to migrating salmon have been reduced. What has been accomplished thus far in a small way may be achieved in much larger measure with completion of the permanent program.

An important part of the Hell's Gate investigation has been the tagging program carried out in the river with the object of confirming the water levels at which fish can pass the gate. With this purpose in view, 8,684 fish were tagged at Hell's Gate during the 1943 season. Total recoveries above or below the gate (but not including those recovered at the gate) to March 16, 1944, were 2,850 or 32.8 per cent of the number tagged. The results confirmed the earlier assumption that a block exists between the approximate levels of 27 and 40 feet. Above or below this range salmon have a relatively free passage. The period of blockade as determined from these data was found to be short during 1943, with consequent advantage to the migrating sockeye.

A scale model of the Hell's Gate canyon, constructed on the grounds of the Hydraulics Laboratory of the University of Washington in Seattle, has been under intensive study. With the aid of the model it is possible to reproduce conditions in the canyon and to study the effects of various proposed remedial measures. In this way the Commission's engineers are determining the best solution to the Hell's Gate problem.

Tagging of sockeye at Sooke was continued with the excellent co-operation of the fishing industry. A total of 1,053 sockeye were tagged, 502 or 48 per cent of which were later recovered. Results of the tagging at Sooke are as follows:

Year	Number tagged	Number recovered	Per cent recovered
1938.....	980	439	44
1939.....	1,042	558	54
1940.....	930	437	47
1941.....	849	503	59
1942.....	1,803	793	44
1943.....	1,053	502†	48

† Number recovered as of March 31, 1944.

During 1943 few tagged fish were recovered in streams or areas other than the Fraser. Fish tagged early in the season are frequently recovered from the Nitinat and Barclay Sound; this year tagging did not commence until July 8. Shortage of personnel made tagging in areas other than Sooke impracticable.

During the 1943 sockeye fishing season the Commission again made observations of the commercial fishing operations. Landing and pack statistics were gathered currently from Puget Sound and Fraser River canneries. The system of fishing vessel log book records was continued in order to provide details of the fishery with respect to location and intensity of fishing and the composition of the fleet. The system of log book records has been in operation for several seasons and promises to yield valuable results. The co-operation of the fishermen has been excellent. All these data are being used to formulate a policy for the ultimate regulation of the fishery as provided for in the treaty establishing the Commission.

Determination of the escapement to the various spawning grounds and the evaluation of the relative success of spawning are important phases of the Commission's scientific investigations. During 1943 all known sockeye streams were patrolled regularly and the necessary information obtained. A weir was placed in the Bowron River and the entire run counted. The Raft River was fenced for the bulk of the run and an approximate population figure obtained. In the Stellako River an intensive tagging program was undertaken for the purpose of population determination. Other regions such as the Harrison, Birkenhead, and Chilko areas were enumerated by calibrated indices based on recoveries of dead sockeye, live counts, or other features of a spawning popula-



tion. A preliminary study of the Pitt River system was made in an attempt to devise a successful method for enumeration of this race of fish. The escapement studies are tedious and expensive but the accuracy of the observations improve each year as the dynamics of a spawning population become better understood.

During the year a number of other investigations have been conducted by the Commission staff. These include a continuation of the research on the history of the fishery, a study of the races of the Fraser River sockeye, and additional lake and river surveys.

The commissioners met twice during the year. At the first meeting, held at New Westminster on April 26, the program of scientific investigations for the year was presented by the Director and it was decided to request a special appropriation from each of the two governments for the preparation of final plans for the Hell's Gate fishway. On November 24, the Commission met again, this time at Vancouver. The scientific and engineering aspects of the Hell's Gate obstruction were discussed in detail and it was decided to recommend to the two governments the immediate removal of all important obstructions to salmon migration. At this meeting Tom Reid, M.P., retired as Chairman and E. W. Allen as Secretary. Mr. Allen was elected Chairman and A. J. Whitmore, Secretary.

During the year Dr. W. F. Thompson, in order to devote more of his time to fisheries research, resigned as Director of Investigations and is now retained as Consultant for scientific research. B. M. Brennan, Director of the State of Washington Department of Fisheries and a member of the Commission, was appointed to the position of Director. Fred J. Foster, Director of Fisheries for the State of Washington, replaced Mr. Brennan as a Commission member. Dr. Donald C. G. MacKay, a Canadian biologist recently associated with the University of Connecticut, succeeded Dr. J. L. Kask as Assistant Director. Two staff members were called into the armed forces during the year: A. E. Peterson, now with the United States Navy, and R. W. Simmons, with the United States Army.

### INTERNATIONAL FISHERIES COMMISSION, 1943

In fulfillment of its duties under the treaty of January 29, 1937, the International Fisheries Commission continued during 1943 the regulation of the Pacific halibut fishery. It also carried forward the scientific investigations of the condition and trends of the fishery which provide a rational basis for control.

Meetings of the Commission were held on April 28 at Vancouver and on November 30, December 1 and December 2 at Seattle, to consider matters connected with the investigation and regulation of the fishery.

The Commission met with delegations from the Seattle otter trawlers and from the Alaska salmon trollers on November 30 and received from them petitions pertaining to the halibut regulations.

On December 1, a meeting was held with the Conference Board, composed of representatives of the halibut fleets. The results of commission investigations regarding the condition of the stocks of halibut were considered and recommendations of the fleets for the regulation of the fishery in 1944 were discussed.

Regulations governing halibut fishing in 1943 were issued on February 15. These differed in a few respects from those of the previous year. They increased the catch limit for Area 2, extending from Willapa Harbour in Washington to Cape Spencer in Alaska, from 22,700,000 to 23,000,000 pounds and that for Area 3, lying between Cape Spencer and the Aleutian Islands, from 26,800,000 to 27,500,000 pounds. They extended to November 30 the period of validity of permits under which setline vessels retain and land limited amounts of halibut caught incidentally during fishing for other species in areas closed to halibut



fishing. As an aid to enforcement on shore, they required receivers to halibut to report the arrival of catches of halibut taken under permit to enforcement officers before unloading.

All areas were opened to halibut fishing on April 16, as in the previous year. The catch limit for Area 2 was attained and Areas 1 and 2, including all grounds south of Cape Spencer in Alaska, were closed to halibut fishing at midnight of June 20, nine days earlier than in 1942. Areas 3 and 4 including all grounds north and west of Cape Spencer were closed at midnight of September 8, when the Area 3 catch limit was reached, seventeen days earlier than in the preceding year. Limited amounts of halibut, caught under permit and not chargeable to the catch limits, continued to be landed until November 30 as provided in the regulations.

Two factors, which increased the rate of landings, were mainly responsible for the earlier attainment of the catch limits in Areas 2 and 3 and for the earlier closure of the areas. These were an increase in the number of boats fishing in each area and a relaxation of the fishermen's voluntary curtailment system, adopted some years earlier by the fleets in an effort to prolong the fishing season and to secure a more orderly marketing of the catch. Trip limits and tie-up periods between trips, upon which the control of landings depended, were increased and decreased, respectively.

Landings of halibut reported on the Pacific Coast during 1943 amounted to 53,575,000 pounds. Of this total, 462,000 pounds were caught in Area 1, which lies south of Area 2 along the coasts of Washington, Oregon and California. Catches of 24,696,000 pounds and 28,417,000 pounds were made in Areas 2 and 3, respectively. No halibut were landed from Area 4, which includes banks along the Aleutian Islands and in Bering Sea. The catch from Area 2 included 842,000 pounds, taken under permit after closure of the area to regular halibut fishing.

The halibut catch by Canadian vessels amounted to 12,827,000 pounds, of which 10,988,000 pounds were caught in Area 2 and 1,839,000 pounds in Area 3. The Canadian catch was 1,651,000 pounds greater than in 1942 and had been surpassed only in one year since 1914.

The program of biological and statistical investigations, which the Commission has found to be indispensable to the rational control of the fishery, was continued as well as wartime conditions permitted. Changes in the fishery were observed and changes in the stocks of halibut were measured to ascertain the success of past regulations and to provide a sound basis for future regulations.

The abundance of halibut as measured by the catch per unit of fishing effort showed considerable improvement in Area 2 but was practically unchanged in Area 3. The average catch per unit of gear fished in Area 2 was 14.6 per cent greater than in 1942, and 112 per cent higher than in 1930 when the abundance of halibut reached the lowest point in the history of the fishery. The catch per unit of gear in Area 3 was less than one per cent above that of the preceding year but 110 per cent greater than in 1930.

Investigation of the changes in size and age composition of the marketable stocks, necessary for a proper understanding of the changes in abundance, were carried forward by sampling of the commercial landings. Approximately 25,000 halibut from various banks were measured and materials for the determination of ages were taken from 2,500 of these.

Analyses of the length measurements of fish samples from the commercial catch demonstrated that there had been no further increase in the numbers of larger and therefore of mature halibut in Area 2. However, they revealed that the increase in abundance in Area 2 during 1943 had been caused by the appearance of halibut of the smallest commercial sizes in greater numbers than in any other recent year. Such an increase in the numbers of small fish was

predicted some years earlier on the basis of the unusually successful spawning demonstrated by investigations in the winter of 1936-37. The increased supply of young should compensate in part for the reduced supply that must be expected from the relatively poor spawning conditions found each winter from 1938-39 to 1941-42, inclusive.

Age determinations, required to determine the changes in the age composition of the stocks in Area 2, the year of origin of those changes and thus the causes of them, were continued on a limited scale, using age materials collected in conjunction with the taking of market measurements from 1935 to 1943. Many data were added to those already on hand but another year's work will be required to accumulate a sufficient number of age determinations to justify analysis.

Investigations of the success of spawning, such as those conducted at sea in Area 2 each winter from 1933-34 to 1942-43, had to be abandoned in the winter of 1943-44 because wartime conditions did not permit the continuous day and night vessel operations which experience has shown to be necessary to secure adequate coverage of the spawning grounds. The temporary suspension of this winter field work made it possible to undertake more detailed analyses of the spawning data from the previous nine years and to begin the organization of this material for publication.

Analysis of spawning materials collected during the previous winter and comparison of results with those of earlier years showed that the production of eggs in the 1942-43 spawning season was much greater than during the preceding four seasons, though below the high level reached in 1936-37. This improvement in spawning should be reflected in the abundance of small fish in the commercial catches of 1949 and following years and should compensate to some extent for the reduced spawnings of the four preceding years.

The Commission's investigations continued to measure and explain the condition of the stocks of halibut and the changes occurring in them as a result of regulation. They made apparent that the stock in Area 3 was in very good condition and that the annual yield from that stock was approaching the maximum which the grounds could produce. They showed that in Area 2 the stock was continuing to improve but was still far below the level of abundance that the grounds could support. They indicated that the 1943 yield from Area 2 was considerably below the amount that could be secured through continued rational control of the fishery.

The yield of the Pacific halibut fishery was 10,000,000 pounds greater in 1943 than the unrestricted fishery was able to take immediately prior to regulation and was possibly as much as 20,000,000 pounds more than it would have been if the fishery had been permitted to continue its unregulated course. This greatly increased catch was taken with one-third less work and, at current prices, added about 1,750,000 to the annual earnings of the halibut fishermen of Canada and the United States.

Canadian representation on the Commission changed early in the year when Mr. L. W. Patmore, K.C., of Victoria, B.C., who had been a member since 1938, resigned. Mr. G. W. Nickerson, of Prince Rupert, B.C., was appointed to fill the vacancy. Continuing members of the Commission were Mr. A. J. Whitmore, Department of Fisheries, Ottawa, for Canada and Mr. Edward W. Allen, Seattle, Washington, and Mr. Charles E. Jackson, United States Fish and Wildlife Service, Washington, D.C., for the United States. Mr. Allen served as Chairman and Mr. Patmore and Mr. Nickerton, successively, as Secretary.

D. B. FINN,  
*Deputy Minister of Fisheries.*

## APPENDIX No. 1

### REPORT OF COL. A. L. BARRY, CHIEF SUPERVISOR OF FISHERIES, EASTERN DIVISION, 1943

Figures in this report pertaining to catches and values of the fisheries are approximate only. They are given subject to revision and correction. Final figures will be found in *Fisheries Statistics of Canada 1943*.

The total quantity of fish and shellfish landed in the division during 1943 amounted to approximately 518,789,200 pounds, an increase over the amount landed in 1942 of 63,841,000 pounds.

All varieties of fish show a decided increase in value over 1942, the landed value being \$5,977,000 more than the amount realized in the earlier year. The total landed value of all fish taken within the division amounted to approximately \$19,650,300 and the total marketed value to about \$36,590,300.

#### THE COD FISHERY

Cod landings show an increase of over 15,000,000 pounds when compared with the previous year, the 1943 total quantity being 155,241,000 pounds. The landed value of cod for the division amounted to \$5,450,000 or \$1,456,000 more than the amount realized during 1942.

#### THE LOBSTER FISHERY

There was an increase of 1,647,000 pounds in the catch of lobsters, with an increase of \$1,707,000 in landed value. Prince Edward Island and New Brunswick report catches somewhat smaller than last year but the Nova Scotia catch is greater. There were 27,892,000 pounds of lobster taken in the division, which brought a return of \$5,420,000.

#### THE SARDINE FISHERY

The sardine fishery, which is confined to the Bay of Fundy section of New Brunswick, shows an increase of 15,922,000 pounds in catch and an increase of \$328,400 in landed value. Catch was 79,235,000 pounds and landed value \$1,283,779.

#### THE HADDOCK FISHERY

An increase of approximately 2,725,000 pounds occurred in the haddock catch; the landed value shows an increase of \$285,000. The bulk of the catch of this fish is taken off Nova Scotian waters.

#### OTHER FISHERIES

The other principal varieties taken during the year were mackerel, herring, swordfish, hake and smelts. All show increased catches and landed values with the exception of hake and smelts, which decreased in catches but increased in values.

#### *Nova Scotia*

Fishermen and the fishing trade generally were well satisfied with results of fishing activities in Nova Scotia during 1943. Most varieties of fish were plentiful and in keen demand. The total catch was 304,582,400 pounds and the landed value \$12,757,400. In the Cape Breton Island section landings were 13,022,000 pounds above those of 1942. This increase has been largely due to heavier catches of cod, mackerel and swordfish.

In the eastern mainland there was an increase of 17,918,000 pounds in the amount of fish taken. Of this total cod accounts for 10,141,000 pounds, haddock,



1,995,000 pounds, herring, 1,699,000, mackerel, 2,223,000, and lobsters, 723,000 pounds.

Western Nova Scotia likewise made a heavier catch than during the two preceding years though offshore fishing was curtailed to some extent by shortage of labour ashore.

The following table gives a statement of the total catch, the landed and the marketed values for the province, as well as similar information concerning the principal varieties, though it is to be kept in mind that all figures are approximate only:—

1943

Total quantity of all fish landed..... 304,582,400 pounds  
 Total landed value ..... \$ 12,757,430  
 Total marketed value ..... 22,901,461

	Pounds	Landed Value	Marketed Value
		\$	\$
Cod.....	133,404,600	4,660,994	8,437,379
Lobsters.....	15,413,400	3,094,565	4,220,674
Haddock.....	28,213,200	1,202,701	2,397,855
Mackerel.....	24,674,000	893,014	1,446,857
Swordfish.....	3,020,900	819,886	1,106,023
Herring.....	44,351,900	559,950	1,457,448
Scallops (gallons).....	49,870	242,339	290,241
Pollock.....	12,508,300	239,440	641,368
Hake.....	9,532,900	204,294	338,776

### New Brunswick

Total landings in New Brunswick for 1943, including the commercial catch from inland waters, amounted to 18,120,100 pounds more, and the landed value to \$1,428,300 more, than in the preceding year. Although the catch of lobsters was 445,800 pounds less than in 1942, the financial return to the fishermen increased by \$348,000. The sardine figures increased by 14,500,000 pounds on the one side and \$315,000 on the other. All the other chief varieties of fish taken in New Brunswick show increased catches and landed values, with the exception of smelts, clams and hake.

By itself, the commercial catch in the inland district was 1,235,000 pounds with a landed value of \$53,950 and a marketed value of \$58,032.

The following table shows the total catch, landed and marketed values of all fish taken in New Brunswick, as well as similar information concerning the principal varieties:—

1943

Total quantity of all fish landed..... 181,779,500 pounds  
 Total landed value ..... \$ 5,077,649  
 Total marketed value ..... 10,828,785

	Pounds	Landed Value	Marketed Value
		\$	\$
Lobsters.....	6,507,200	1,326,464	2,326,024
Sardines.....	77,853,600	1,270,367	3,068,412
Cod.....	15,614,000	538,906	927,880
Herring.....	47,804,900	432,514	1,681,881
Smelts.....	3,514,600	411,183	662,778
Salmon.....	1,332,100	299,154	411,823
Clams.....	6,636,700	120,068	279,667
Oysters.....	3,405,400	117,524	204,782
Hake.....	3,786,000	112,325	246,461

*Prince Edward Island*

There was an increase of approximately 4,028,000 pounds in Prince Edward Island catch, an increase in landed value of \$720,000 and an increase in marketed value of \$1,220,000. Supervisor Larabee reports that the fishermen in his district experienced reasonably favourable weather and other conditions during the fishing seasons. Some storms impeded operations but the people in the fishing industry had little or no cause for complaint as very little loss of equipment resulted and the financial returns from the landings were greater than usual.

The major fisheries, with the exception of lobster, hake and oysters, show substantially increased landings and all fisheries, with the exception of oysters, yielded landed and marketed values proportionately greater than in 1942.

Herein is shown the total catch, landed and marketed values of all fish taken in Prince Edward Island as well as similar information concerning the principal varieties:—

	Pounds	Landed Value	Marketed Value
		\$	\$
Lobsters.....	5,971,900	999,930	1,163,473
Hake.....	7,284,900	277,800	596,899
Cod.....	6,222,500	250,568	438,595
Mackerel.....	2,592,100	114,099	242,235
Herring.....	5,866,100	70,671	151,229
Oysters.....	1,281,400	50,600	62,958
Smelts.....	720,100	49,265	70,589
Clams.....	569,000	10,460	23,990

## SPORT FISHING

*Nova Scotia*

In Cape Breton salmon angling during the year was not quite as successful as in 1942. In the eastern mainland section there was good angling during the year; catches of trout were as good as the previous year and there does not appear to be any depletion of the stocks. In the western mainland salmon and trout angling showed improvement over 1942. Water levels were higher than usual throughout the year and salmon were attracted into rivers. Visiting anglers were few, owing to wartime conditions.

*New Brunswick*

In New Brunswick salmon angling conditions were much better than during the previous year. Water conditions were better this year and both resident and non-resident anglers had a successful season. There were large numbers of salmon in the pools at the end of the season and prospects are good for next year. Despite satisfactory water conditions the catch of trout decreased. This is probably due to the high mortality in 1942 when large numbers of trout died during July and August because of low water and hot weather conditions which prevailed.

*Prince Edward Island*

Trout fishing in island waters generally was fairly good and an improvement was noted over 1942. Good catches were taken in all counties during the early part of the season; later in the season catches declined because of warmer water. In each of the counties spawning conditions were satisfactory at the close of the season.



## FISHERIES PATROL SERVICE

*Nova Scotia.*—In the Cape Breton island section the usual patrol was carried out in lobster fishing district 6A with satisfactory results. Along the eastern mainland patrol was carried out by the department-owned boat *A. Halkett*, assisted by the patrol boat No. 666. In the western sections patrol was carried out by the departmental boats *Capelin* and *Gilbert*, assisted by a chartered boat in the Yarmouth area.

*New Brunswick.*—In the Bay of Fundy section the Department's boats, *Thresher* and *Gannet Rock II*, were again employed throughout the year. In the Northumberland Strait section a fleet of four chartered boats was on duty from the last week of April until the end of November.

*Prince Edward Island.*—In Prince Edward Island six patrol boats were engaged; one was the department-owned *Capitol* and the others were chartered for duties in the several sections of the province.

Generally speaking, the patrol services throughout the division gave effective protection during the fishing seasons. The boats were primarily engaged in the protection of the lobster fishery with attention being given to the salmon, oyster, smelts, and other fisheries as required.

## STATEMENT AS TO LOBSTER PACK AND THE INSPECTION OF CANNERIES IN 1943

During the year licences to can lobsters and tomalley were issued to 132 plants. Of these plants 128 were operated as compared with 113 in the year before, 117 in 1941 and 137 in 1940. By provinces, the number of canneries operated in 1943 was as follows: Nova Scotia 36, New Brunswick 44, Prince Edward Island 48.

Preliminary and unrevised figures show a total pack of 56,882 cases of lobster within the division during 1943. As compared with 1942 there was a decrease of 2,545 cases, or slightly more than 4 per cent. In comparison with the 1941 pack, however, there was an increase of 4.8 per cent, and of more than 5 per cent as compared with 1940 output.

Nova Scotia's 1943 cannery production was 20,863 cases, in New Brunswick the pack was 17,427 cases, and in Prince Edward Island 18,592. (Fractional cases have been omitted). In Nova Scotia there was a decrease of 4 per cent, as compared with 1942 pack. As compared with the output of 1938, the last full year of peace, the provincial pack decreased by almost 45 per cent. In New Brunswick the reduction was 2.7 per cent below that for the preceding year, and slightly more than 24 per cent below the 1938 figures. The 1943 reduction in Prince Edward Island was 6 per cent, and as compared with 1938 the decrease was 24.5.

*Spring Season Pack.*—In the Spring season the Nova Scotia canneries put up over 20,800 cases, the New Brunswick plants 8,014, and for Prince Edward Island the figures were 15,318. There was some decrease both in Nova Scotia and Prince Edward Island, as compared with 1942, but small gain occurred in New Brunswick.

*Fall Season Pack.*—Total cannery production in the Maritimes during the fall season was some 12,600 cases, a decrease of about 1,100 cases as compared with 1942 figures. Practically all of the Fall season lobster canning is done in New Brunswick and Prince Edward Island, much the larger part of the pack being put up by New Brunswick plants or, in 1943, over 9,420 cases. The New Brunswick figures showed a decrease of slightly more than 800 cases. In Prince Edward Island the reduction was under 300 cases.

*Cannery Inspection.*—During the 1943 canning seasons careful attention was given to the inspection of plants so that it might be certain that sanitary

conditions and operating methods were satisfactory. All told, there were 759 inspections by 27 inspecting officers. The average number of inspections per cannery was 5.9.

#### FISH INSPECTION

Inspection was made of such fish products as are required to be inspected under the Fish Inspection Act. Large quantities of fresh frozen fish for shipment overseas on British Food Ministry account were also inspected, together with a fairly large quantity of salted semi-boneless fish. In addition to the regular inspection staff a number of seasonal inspectors had to be engaged to assist in the inspection of fresh frozen fish.

Throughout the canning season fishery inspectors were required to procure samples of different packs and forward them to the Fish Inspection Laboratory at Halifax for examination. Where faulty technique in canning was found it was called to the attention of the packers concerned, so that they might correct faults and be enabled to put up products of more uniform and better quality.

#### ILLEGAL FISHING

During the year illegal fishing was at a minimum. Close co-operation between the inspectors, patrol boat men, and guardians was maintained. Owing to the fact that there were many opportunities for employment at remunerative wages fewer men were inclined to fish illegally.

#### REDUCTION OF FISH WASTE AND COARSE FISH

During the year 17 firms in the division produced fish meal and oil. Of these, twelve operated in Nova Scotia, four on the Bay of Fundy shore of New Brunswick, and one on the New Brunswick north shore.

#### LOSS OF LIFE AND FISHING GEAR

It is regretted that 32 fishermen lost their lives during the year. Twenty-nine were from Nova Scotia, one from New Brunswick and two from Prince Edward Island. Of the Nova Scotia fishermen lost, twenty-six were crew members of the vessel *Flora Alberta*, which was sunk in collision off the fishing banks. Loss of fishing gear and damage amounted, all told, to approximately \$190,700.

#### FISHING FLEETS

In Cape Breton Island a number of boats were added to the fleet by construction or by purchase from outside the district, resulting in an increase in the number of vessels, boats, and aggregate crew. The eastern mainland fleet remained the same as last year while 11 small boats were added in Halifax County and 11 in Guysboro County. During the year a number of Newfoundland vessels made landings at the port of Halifax. The offshore fleet operating out of Lunenburg was reduced by four vessels but landings from the fleet increased considerably over 1942 figures. The scallop fleet based at Digby remained about the same.

In New Brunswick the cod fishing fleet was about the same as in 1942. The salmon drift net fleet was reduced by 26 boats.

There was a slight decrease in the number of vessels and boats operating in Prince Edward Island as compared with 1942 totals.

#### EDUCATIONAL WORK

During the year, in addition to technical instructions given to fishermen by departmental officers, the program of adult education to assist fishing groups was continued under the department's arrangements with St. Francis Xavier University.

The results of short courses put on at different centres throughout the Maritimes is reflected in more efficient business methods of fishermen's co-operatives. These headquarters are invariably asked to send a lecturer for a day or so to encourage groups in straight dealings and improvement in fish products' quality. The interest taken by co-operatives in promoting government inspection shows that these lectures are bearing fruit.

#### CONCLUSION

This report is condensed more than formerly and very incompletely reflects the numerous activities of our officers and the many demands on their time in matters both directly and indirectly connected with the war effort. Aside from their regular official duties, our supervisors and inspectors are looked to as among the leaders in their several communities in most activities connected with the war and they are encouraged by headquarters to give all assistance that may be feasible.

There is harmony throughout the Division and the kindly co-operation of headquarters at Ottawa is much appreciated.

#### APPENDIX No. 2

### ANNUAL REPORT OF CHIEF SUPERVISOR OF FISHERIES (MAJOR J. A. MOTHERWELL), WESTERN DIVISION (BRITISH COLUMBIA), FOR 1943

On the opening of sockeye salmon fishing there was an absence of the usual eagerness to make ready. Gill-net fishermen were slow in arriving in the several fishing areas, particularly those in the north, and did not appear to be keen to commence fishing. Some of the suggested reasons are as follows: (1) The fishermen had recently been employed profitably in halibut, grayfish, and cod fisheries, and were apparently in no immediate need of money; (2) the fishermen had not been informed definitely by their union as to the outcome of the negotiations with the operators regarding salmon prices and were not willing to start fishing until the information was forthcoming from their own representatives.

The total pack of all varieties of salmon, 1,258,221½ cases, was the smallest since 1932. That year was the second season of a 3-year period of small packs, as follows:

	Cases
1931 .....	685,104
1932 .....	1,081,031
1933 .....	1,265,072

These totals compare with an average of 1,674,299 cases during the past five seasons. Reports from the spawning grounds in the brood years of the several varieties were such as to make any expectation of a good pack in 1943 unjustified. It was not a question of depletion of salmon so much as the converging of a number of poor cycles into the one season of 1943, in so far as the Fraser District was concerned. Special precautions were taken in some areas to see that a larger percentage of the parent fish reached the spawning grounds. This was particularly the case in the Johnstone Straits and Fraser River areas where the weekly close period was increased by 24 hours and the additional closure maintained throughout practically the whole fishing season. The effect of this measure was that the fishing time was reduced in these two areas by 20 per cent.

The average total salmon packs for the province since 1924 are given in the following statement:

	Cases
1924-1928 .....	1,786,186
1929-1933 .....	1,330,365
1934-1938 .....	1,641,996
1939-1943 .....	1,674,299



## SOCKEYE

Total 1943 sockeye pack, 164,889 cases, was the second smallest since records of the packs of the several varieties were commenced and compared with an average of 384,610 cases for the last five years. The smallest total was in 1921—163,914 cases. No information is available as to why the pack should have been so small in that year. It can only be concluded that either the spawning was not successful or conditions at sea during the period the sockeye remained there were such as to result in unusually high mortality. Such conditions may obtain any year. Small returns of sockeye were expected from the Fraser River area but the catches in the gill-net areas of the Naas, Skeena, and Rivers and Smiths Inlets were below the expectations which it was felt were justified by the spawning conditions in the brood years. Weather conditions during the 1943 fishing season were unusually unfavourable. The average sockeye packs since 1924 are given in the following statement:

	Cases
1924-1928 .....	322,162
1929-1933 .....	318,562
1934-1938 .....	383,515
1939-1943 .....	384,610

*Naas River Area.*—The sockeye total of 13,413 cases compares with 21,746 in 1938 and 24,425 in 1939, these being the two brood years of the 1943 run. Incidentally, there were only 167 gill-net fishing boats operating in the area as compared with 309 in 1938 and 289 in 1939.

*Skeena River Area.*—The pack of 28,259 cases compares with 46,988 cases in 1938 and 68,388 in 1939, the two brood years. The number of gill-net boats operating was 733 as compared with 1,049 in 1938 and 844 in 1939.

*Rivers and Smiths Inlets.*—The combined pack of these two areas reached a total of 66,855½ cases compared with 122,093 cases in 1938 and 71,068 cases in 1939, the two brood years. The number of gill-net boats operating was 1,449, compared with 2,261 in 1938 and in 1939, 1,817.

The delay in the gill-netters' starting operations was more apparent in this area than in others. As a matter of fact, by the opening date only 420 fishermen were reported as being present on the grounds and few of them, if any, had commenced to fish. The local officer estimates that one week's fishing was lost to the industry, which represents approximately 20 per cent of a normal sockeye gill-net season at this point. Weather conditions were also reported as having been unusually unfavourable for fishing. The local officer also observed that the standard of fishing efficiency, taking the fishermen as a group, was not so high as in other seasons, probably owing to many experienced fishermen being employed in war industries. However, even taking all these matters into consideration the pack was still disappointing.

*Fraser River Area.*—The 1943 cycle was known to be definitely a poor one on the Fraser River and only a small pack was expected. The total reached 28,938 cases, compared with 43,294 cases in the brood year, 1939. In addition to the usual conservation measures, an additional 24-hour weekly close season was enforced, which reduced the fishing time by 20 per cent each week. There were 2,535 salmon gill-netters operating in the area in 1943, compared with 2,161 in 1939. The percentage of escapement to the spawning grounds was larger than normal and well justified the extra conservation measure.

## COHOES

Coho pack totalled 171,983 cases, compared with 201,467 in the brood year of 1940. However, the pack of cohoes varies from year to year, according to the demands of the cold storage plants. The average annual packs since 1929, arranged in three-year periods, have been as follows:



	Cases
1929-1931 .....	133,213
1932-1934 .....	164,543
1935-1937 .....	180,829
1938-1940 .....	237,055
1941-1943 .....	240,412

## PINKS

The total of 530,188½ cases of pinks compares with 427,766 cases in the brood year and an average of 400,405 cases during the past two years. The usual good pack from the Fraser River run did not materialize. Output from this run amounted to only 30,394 cases, compared with 102,799 cases in the brood year of 1941. Judging from the spawning in 1941 there seemed every reason to expect a better return. However, the actual run, as reported by the fishery officers following their survey of the spawning streams, was larger than the pack would indicate. Here again, no doubt, the extra 24-hour weekly close season was a factor. Even so, the run of pinks to the Fraser system was disappointing. On the other hand, there was a very large run to the Bella Coola area and an unexpectedly good seeding in the Central and Butedale areas. Spawning conditions in the Bella Coola area in 1941 gave good promise of big returns in 1943 as all the pink streams in the brood year were reported as being full of spawning pinks. Whilst large catches were made in the Central area, most of these were from fish on their way to the Bella Coola system. The packs of pinks, shown in two-year averages, since 1930, have been as follows:

	Cases
1930-1931 .....	659,466
1932-1933 .....	378,137
1934-1935 .....	475,165
1936-1937 .....	588,554
1938-1939 .....	510,735
1940-1941 .....	320,838
1942-1943 .....	400,405

## CHUMS

Total chum pack, 363,347½ cases, compares with a total of 386,584 cases for the season of 1939 and an average of 641,858 cases for the past four years. Chum pack, like that of cohoes, is affected largely by the demands of the cold storage plants. The 1943 situation was also affected by the unusually small quantities of halibut held in British Columbia freezers. Chum packs since 1924, in four-year averages, were as follows:

	Cases
1924-1927 .....	610,618
1928-1931 .....	436,337
1932-1935 .....	380,795
1936-1939 .....	493,371
1940-1943 .....	641,858

## SALMON—GENERAL

The number of sockeye salmon required to fill a case of 48 one-pound talls, in the several gill-net areas, during the season of 1943 was as follows:

Fraser River .....	13.01
Skeena River .....	13.32
Naas River .....	12.00
Rivers Inlet .....	11.70
Bella Coola .....	17.10
Butedale .....	12.10

## DEPARTMENT OF FISHERIES

## INSPECTION OF CANNED SALMON

The following are the detailed results of the year's inspection of canned salmon at the laboratory maintained by the department, in Vancouver:

Number of inspections made.....	1,467
Total number of cases inspected .....	1,210,597½
Total number of cases below certificate standard .....	44,044½
Total number of cases available for certificates .....	1,166,552½

## DETAILS OF CANNED SALMON INSPECTION ACCORDING TO SPECIES

Species	Number of cases inspected	Number of cases below certificate standard	Number of cases eligible for certificates
Sockeye.....	169,831	6,362	163,469
Springs.....	9,206	55	9,151
Steelheads.....	3,392	.....	3,392
Bluebacks.....	14,033½	36	13,997½
Coho.....	157,101½	746	156,355½
Pinks.....	517,751	28,497	489,254
Chums.....	339,282½	8,348½	330,934
Totals.....	1,210,597½	44,044½	1,166,552½

## PARTICULARS OF NON-CERTIFIED SALMON ACCORDING TO SPECIES

Species	Below Grade B	Grade B	Tips and Tails	Minced Flakes, etc.	Totals
Sockeye.....	.....	3,789½	1,052	1,520½	6,362
Springs.....	.....	51	4	.....	55
Steelheads.....	.....	.....	.....	.....	.....
Bluebacks.....	.....	.....	36	.....	36
Coho.....	.....	3	743	.....	746
Pinks.....	.....	27,944½	552½	.....	28,497
Chums.....	.....	8,136	154½	58	8,348½
Totals.....	.....	39,924	2,542	1,578½	44,044½

The report of F. Charnley, Chief Chemist, covering the year's operations at the laboratory will be found as Appendix No. 6.

Salmon inspection fees collected, at the rate of one-half cent per case, amounted to \$6,155.22.

## SALMON FOR UNITED KINGDOM

Under the agreement with the British authorities the 1943 salmon pack was made available to the British Ministry of Food, with the exception of 200,000 cases reserved by the Canadian Government for domestic consumption, 100,000 cases for the Canadian Government for special purposes, and in addition such an amount for supply to other dominions and colonial dependencies in the West Indies as the Canadian Mutual Aid Board in consultation with other allocation authorities might decide. The prices paid by the British Ministry of Food for the 1943 pack were as follows:

	1 lb. Tall Cans—48 to the Case	$\frac{1}{2}$ lb. Flat Cans—96 to the Case	$\frac{1}{2}$ lb. Flat Cans—96 to the Case
<i>Grade A Salmon</i>	\$ cts.	\$ cts.	\$ cts.
Grade I (sockeye).....	16 25	17 50	10 50
Grade II (coho, redspring, blueback and steelhead)...	11 50	12 75	8 12 $\frac{1}{2}$
Grade III (pink and chum).....	6 25	7 50	5 00
<i>Grade B Salmon and Grade A Tips and Tails, Minced or Flaked Salmon</i>			
Grade I (sockeye).....	12 75	14 00	8 75
Grade II (coho, redspring, blueback and steelhead)...	10 00	11 25	7 37 $\frac{1}{2}$
Grade III (pink and chum).....	5 50	6 75	4 62 $\frac{1}{2}$

**SALMON TAKEN BY INDIANS OF THE PROVINCE FOR PURPOSES OF THEIR  
OWN FOOD SUPPLIES, UNDER FREE PERMIT**

	Sockeye	Springs	Steel- heads	Coho	Pinks	Chums	Total
	(fish)	(fish)	(fish)	(fish)	(fish)	(fish)	(fish)
District No. 1.....	28,196	8,875	1,525	6,420	5,220	4,498	54,734
District No. 2.....	85,817	7,327	650	25,738	21,234	25,093	165,859
District No. 3.....	20,380	7,135	2,000	13,850	7,133	78,240	128,738
Totals.....	134,393	23,337	4,175	46,008	33,587	107,831	349,331

**SALVAGING OF SALMON FRY**

During the year, by means of transferring from shallow pools to deep water, the following quantities of the several varieties of salmon were saved by the fishery officers:

Area	Springs	Steelheads	Coho	Chums	Total
<i>District No. 1—</i>					
Squamish Area.....	2,800		5,600		8,400
Chilliwack Area.....			5,050	1,050	6,100
Nicola River.....	1,500		1,500		3,000
Total.....	4,300		12,150	1,050	17,500
<i>District No. 3—</i>					
Victoria Area.....		1,950	7,875	29,550	39,375
Barclay Sound Area.....			41,000		41,000
Cowichan Area.....	2,000		78,000	51,000	131,000
Total.....	2,000	1,950	126,875	80,550	211,375
Total for Province.....	6,300	1,950	139,025	81,600	228,875

**HALIBUT**

Total landings of halibut at British Columbia ports during the year, including those by United States vessels, amounted to 250,034 hundred-weights, compared with 243,915 hundredweights in the preceding year.

Following are figures showing landings in different centres in the province in recent years:

Year	Vancouver and New West- minster	Prince Rupert	Butedale- Namu Area	District No. 3	Totals
	cwts.	cwts.	cwts.	cwts.	cwts.
1930.....	11,387	293,617	978	2,814	308,796
1931.....	8,498	167,757	3,627	2,123	182,005
1932.....	11,883	148,615	6,677	1,672	168,847
1933.....	13,436	144,065	10,431	2,440	170,372
1934.....	16,113	150,476	13,297	2,716	182,602
1935.....	22,351	129,586	15,713	3,493	171,143
1936.....	20,777	131,830	11,522	3,992	168,121
1937.....	23,334	147,638	12,676	3,777	187,425
1938.....	28,155	141,691	17,776	5,866	193,488
1939.....	30,225	173,857	18,651	4,455	227,188
1940.....	26,010	185,921	23,157	3,955	239,043
1941.....	22,057	166,513	30,946	10,142	229,658
1942.....	30,547	180,789	21,638	10,941	243,915
1943.....	44,201	180,507	12,003	13,323	250,034

It is of interest to note that in 1943 Canadian vessels also landed 45,335 pounds in Sitka, Alaska, and 94,451 pounds in Seattle.

CLAMS

All told, 13,626 cases of clams were packed, compared with 17,808 cases in 1942. The smaller total was due, primarily, to shortage of diggers. The quantities of clams marketed during the years 1934 to 1943 have been as follows:

Year	Marketed fresh (cwts.)	Canned (cases)
1934 .....	6,332	5,815
1935 .....	15,716	10,209
1936 .....	26,530	12,579
1937 .....	27,018	12,587
1938 .....	42,169	22,155
1939 .....	21,601	5,431
1940 .....	20,785	7,151
1941 .....	25,402	12,783
1942 .....	8,278	17,808
1943 .....	8,397	13,626

HERRING FOR UNITED KINGDOM

By agreement with the British authorities the total pack of canned herring, of the season 1943-44, excluding fish of Grade B quality, was reserved for the British Ministry of Food, apart from 10 per cent which was made available to the Canadian domestic market. The prices paid in 1943, which were the same as in the preceding year, are shown below:

Grade A	{ 1-pound oval cans.....	\$4.80
	{ 1-pound oval cans.....	3.95
	{ 1-pound tall cans.....	4.22

The total tonnage taken by herring fishermen during the year was 91,397 tons, utilized as shown in the following statement:—



	District No. 1	District No. 2	District No. 3	Total	Green Tons
Catch.....cwt.s.	5,376	284,616	1,537,951	1,827,943	91,397
Production—					
Marketed fresh.....cwt.s.	5,376		225	5,601	280
Canned.....cases	1,199,177	7,691	165,907	1,372,775	54,911
Kippered.....cwt.s.	2,503		11	2,514	251
Bloatered.....cwt.s.	4			4	
Pickled.....bbl.s.	1,477	497	2,726	4,700	1,174
Used as bait.....bbl.s.	12,555	17,138	14,389	44,082	4,408
Herring meal.....tons	2,212.6	2,103.2	2,810.7	7,126.5	} 30,373
Herring oil.....lbs.	3,218,685	1,257,078	1,734,255	6,210,018	
					91,397

## HERRING INSPECTION

The following are the detailed results of the year's inspection of canned herring at the laboratory maintained by the department, in Vancouver:—

## CANNED HERRING INSPECTIONS FOR SEASON 1942-1943

Number of inspections made.....	574
Total number of cases inspected.....	1,238,394½
Total number of cases below certificate standard.....	38,890½
Total number of cases available for certificates.....	1,199,504

## DETAILS OF CANNED HERRING INSPECTIONS ACCORDING TO SPECIES

	Number of cases inspected	Number of cases below Certificate Standard	Number of cases eligible for Certificates
1 lb. talls.....	189,560	2,533	187,027
1 lb. ovals.....	914,502	30,927½	883,574½
½ lb. ovals.....	134,332½	5,430	128,902½
Totals.....	1,238,394½	38,890½	1,199,504

	Number of cases inspected	Number of cases below Certificate Standard	Number of cases eligible for Certificates
	Grade B	Below Grade B	Total
1 lb. talls.....	2,282	251	2,533
1 lb. ovals.....	29,692	1,235½	30,927½
½ lb. ovals.....	5,430		5,430
Totals.....	37,404	1,486½	38,890½

Herring inspection fees collected, at the rate of one-half cent per case, were \$7,466.17.

## VIOLATIONS

During the year there were 183 prosecutions for infractions of the fishery regulations, resulting in the collection of \$16,736.51, as follows:—

	District No. 1	District No. 2	District No. 3	Totals
Prosecutions.....	63	62	58	183
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Fines.....	858 00	1,970 00	1,915 00	4,743 00
Sales.....	3,614 88	4,572 69	3,806 03	11,993 51
Total—Fines and Sales.....	4,472 88	6,542 60	5,721 03	16,736 51

## EXPORT PERMITS

Continuing the assistance rendered to the Department of Trade and Commerce, the following export permits were issued by federal fishery officers in British Columbia during the year:—

	Vancouver Office	Inspector Scott, Victoria	Prince Rupert Office	Total
U.S.A.....	483	32	258	773
British Empire.....	54			54
	537	32	258	827

## GASOLINE RATIONING

Continuing assistance given the federal Oil Controller in the issuing of gasoline permits to boats engaged in the fishing industry, a total of 1,862 cards were issued, as follows:—

Vancouver Office .....	772
New Westminster Office .....	220
Prince Rupert Office.....	230
Prince Rupert inspectors in the field.....	208
Nanaimo Office .....	114
Nanaimo inspectors in the field.....	318
Total .....	1,862

## PATROL SERVICE

Patrol boats totalling 102 in number were utilized during the year for protection of the fisheries. Twenty-two of them were departmentally-owned, the others being chartered for periods of from one to six months.

The difficulty of obtaining a sufficient number of suitable boats and personnel, because of war conditions, continues to be a great handicap in the conservation of the fisheries.

## DESTRUCTION OF SEA LIONS

Only 33 sea lions were destroyed by the officers of the fisheries patrol service in the course of their work. Owing to the absence of the two largest departmentally-owned boats, which were transferred to defence service at the commencement of hostilities, and the urgency of other duties, it was not possible to give as much attention to this particular work as wished.

## DESTRUCTION OF HAIR SEALS

A total of 807 hair seals were destroyed during the year by fishermen, who received a bounty of \$2.50 on producing the necessary evidence of destruction in each case. The total bounty paid was \$2,017.50. The number of seals killed was considerably smaller than in an average year, due largely to the difficulty of obtaining ammunition.

## SPORT FISHING

Continued shortage of gasoline for pleasure boats and motor cars again was the cause of a very considerable reduction in the intensity of sport fishing. Another factor was the absence of many sport fishermen in the Armed Forces. The tidal waters continue to provide excellent sport fishing for spring and coho salmon, as well as steelhead and cutthroat trout. Fishing in the Campbell River district is a great attraction, as well as the fishing in such areas as Comox, the Qualicum rivers, and the Cowichan River district along the east coast of Vancouver Island, Alberni Canal, Somass, Stamp, and Nahmint rivers on the West Coast of Vancouver Island, and Horseshoe Bay, Howe Sound, and Burrard Inlet streams on the mainland. Transportation difficulties have reduced the sport fishing at distant points. Many residents operate from the banks and sand bars of the Fraser River with considerable success.

## STAFF

The following changes occurred during the year in the department's permanent staff in British Columbia:—

Eric S. Richardson, Fishery Inspector for the Queen Charlotte Islands area, retired as a result of ill health, after sixteen years of service.

Henry Mahoney, Fishery Inspector for the Kyuquot area, died after twenty years of service.

Edwin H. Thomas, Clerk, Grade 1 in the office of the Supervisor of Fisheries at New Westminster, has been reported missing after an operational flight with the R.C.A.F. over enemy territory. He had been previously awarded the *DFM*.

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Reference to the work done in the clearing of obstructions in British Columbia streams during 1943 will be found in the report of the work of the department's Engineering Branch in Appendix No. 4.

## STATEMENT No. 1—ANNUAL CANNED SALMON PRODUCTION IN BRITISH COLUMBIA—1933-1943

Year	Num <sup>a</sup> ber of can- neries oper- ated	Number of salmon licences issued						Packed canned								Totals
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue- back	Steel- head	Coho	Pink	Chum	
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases
1933.....	49	6,113	2,880	238	31	8	258,107	12,464	1,849	5,953	21,763	1,459	137,289	532,558	293,630	1,265,072
1934.....	49	6,826	3,099	296	9	8	377,882	15,281	1,644	12,859	29,556	1,282	195,874	435,364	513,184	1,582,926
1935.....	43	6,216	3,107	293	9	8	350,444	10,187	3,114	8,619	15,319	596	216,173	514,966	409,604	1,529,022
1936.....	46	6,620	3,511	287	9	7	415,024	16,493	2,527	10,834	33,718	1,068	212,343	591,532	597,487	1,881,026
1937.....	37	6,095	3,162	291	9	5	325,774	10,963	1,788	3,420	19,236	844	113,972	585,576	447,602	1,509,175
1938.....	38	7,125	3,453	300	9	5	447,453	10,276	2,322	2,933	27,417	1,035	273,706	400,876	541,812	1,707,830
1939.....	35	6,502	3,947	339	9	5	269,888	10,302	2,848	2,947	48,209	797	196,887	620,595	386,584	1,539,057
1940.....	38	6,392	3,222	350	9	5	366,403	11,868	2,856	3,017	23,277	1,205	201,467	213,911	643,443	1,467,227
*1941.....	36	5,502	3,080	333	9	5	455,297	17,794	3,911	28,771	30,027	3,454	361,380	427,766	920,470	2,248,870
1942.....	30	6,382	3,878	312	9	5	666,571½	11,197½	3,826	9,721	23,265½	4,649	187,873½	270,622½	633,834	1,811,560½
1943.....	30	6,043	4,346	290	9	5	164,889	4,171½	2,199	4,287½	14,059½	3,095	171,983	530,188½	363,347½	1,258,221½

\* Does not include Salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:—

.....	8	31	1,079.....	.....	39,104.....	6,339	46,56
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\* Does not include Salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:—

.....	8	31	1,079	.....	39,104	.....	6,339	46,56
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NOTE.—Licences issued include transfers from one district to another, except in the case of purse-seines.



## STATEMENT No. 2.—PACK OF CANNED SALMON ON THE NAAS RIVER—1933-1943

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued				Packed canned								Totals
		G.N. Troll	P.S.	D.S.	T.N.	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	
						cases	cases	cases	cases	cases	cases	cases	cases	
*1933.....	3	297				10,173	1,014	227	214	114	19,016	57,406	2,778	90,942
†1933.....						9,757	885	227	184	49	3,251	44,306	1,775	60,434
*1934.....	3	335				36,242	533	126	145	311	26,698	37,698	5,558	107,311
†1934.....						28,701	383	126	145	311	9,935	32,965	2,648	75,214
*1935.....	3	310				12,712	94	298	168	143	21,810	25,508	17,481	78,214
†1935.....						12,245	86	298	168	143	5,125	21,443	12,681	52,189
*1936.....	3	349				28,562	1,622	229	316	496	11,842	72,022	20,196	135,285
†1936.....						24,137	520	188	237	496	8,439	60,582	16,504	111,103
*1937.....	2	321				17,590	773	245	232	46	12,336	7,876	10,530	49,628
†1937.....						11,630	773	245	232	46	316	5,688	6,009	24,839
*1938.....	2	309				21,746	458	189	125	188	20,485	61,660	15,135	119,886
†1938.....						14,795	13	165	125	188	3,986	29,843	6,804	55,919
*1939.....	2	289				24,425	170	389	149	15	3,209	29,819	2,615	60,791
†1939.....						18,834	17	297	137	15	1,667	19,479	1,784	42,230
*1940.....	2	254				13,810	1,258	181	275	120	11,447	29,893	5,461	62,445
†1940.....						8,056	118	95	99	117	1,975	12,151	2,149	24,750
*1941.....	2	281				24,876	133	187	207	377	14,430	23,274	5,971	69,455
†1941.....						14,221	16	125	147	147	6,711	12,570	1,757	35,694
*1942.....	2	328				24,461	496	366	255	619	21,008	54,038½	12,691	113,934½
†1942.....						11,415	46	202	159	155	9,804	24,693½	5,794	52,268½
*1943.....		167				13,413	422	386	194	334	9,769	17,670	10,156	52,344
†1943.....														

\*Pack of fish caught at Naas River regardless where canned.

†Pack of Naas River regardless where caught.

NOTE.—Licences issued, include transfers from other districts.

STATEMENT No. 3—PACK OF CANNED SALMON ON THE SKEENA RIVER—1933-1943

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned										Totals
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum		
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases	
1933	10	1,218					30,506	2,626	444	227		267	39,896	95,783	15,714	185,463	
1933							27,693	6,805	444	828		201	21,366	79,932	10,970	148,239	
1934	9	1,164					70,654	6,844	592	860		114	54,470	125,163	24,388	283,085	
1934							54,558	6,809	592	860		131	21,298	27,628	6,242	118,118	
1935	9	1,053					64,140	3,443	429	188		12	45,512	99,412	31,807	244,943	
1935							52,879	3,422	429	188		14	23,498	81,868	8,122	170,420	
1936	8	970					97,823	4,838	455	435		33	55,198	178,299	36,892	374,018	
1936							81,960	3,781	414	356		33	32,142	92,997	15,343	227,026	
1937	7	850					55,811	3,788	382	315		21	34,502	72,455	37,431	204,705	
1937							41,023	3,704	382	315		21	14,573	57,623	10,027	127,668	
1938	6	1,049					73,508	3,361	1,165	259		42	100,658	146,676	34,785	360,454	
1938							46,988	2,916	1,141	259		42	38,542	69,299	14,668	173,855	
1939	6	844					96,358	3,277	1,488	348		55	48,973	127,521	15,666	293,686	
1939							68,388	3,124	1,396	336		55	27,115	91,559	6,360	198,333	
1940	7	926					133,854	5,884	1,113	571		133	62,516	91,612	62,114	359,797	
1940							116,505	4,708	1,017	396		130	19,196	46,687	4,684	193,323	
1941	7	981					110,544	4,695	703	448		2,261	126,557	73,896	54,357	373,461	
1941							81,183	3,929	641	368		1,890	45,891	51,389	12,138	197,429	
1942	6	775					57,539	5,850	874	832		3,670	70,384	146,322	31,481	316,952	
1942							29,976	5,305	699	617		3,117	36,395½	47,819	10,611	134,539½	
1943	8	733					51,476	1,443	838½	623		2,323	63,638½	122,040	57,579½	299,961½	
1943							28,259	964	440½	379		1,953	40,280½	53,203	6,407½	131,886½	

† Pack of fish caught at Skeena river regardless where canned.

‡ Pack at Skeena river regardless where caught.

NOTE.—Licences issued include transfers from other districts.

STATEMENT No. 4—PACK OF CANNED SALMON FROM FISH CAUGHT AT RIVERS INLET AND SMITHS INLET—1933-1943

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued				Packed canned										Totals
		G.N. Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum		
															cases	
1933.....	11	1,962	.....	.....	.....	119,548	606	108	243	.....	153	9,078	11,658	8,932	150,226	
1933.....	.....	.....	.....	.....	.....	114,045	454	108	241	.....	169	8,514	25,054	9,518	158,103	
1934.....	11	2,318	.....	.....	.....	89,575	532	82	129	.....	121	11,862	2,928	14,375	119,604	
1934.....	.....	.....	.....	.....	.....	82,828	590	82	128	.....	122	8,793	9,769	16,444	118,556	
1935.....	8	2,023	.....	.....	.....	166,686	138	352	155	.....	63	9,576	8,966	19,563	205,499	
1935.....	.....	.....	.....	.....	.....	129,531	94	306	146	.....	49	6,917	6,045	7,128	144,216	
1936.....	8	2,210	.....	.....	.....	59,138	317	132	162	.....	60	7,432	6,437	13,158	86,899	
1936.....	.....	.....	.....	.....	.....	42,803	315	131	148	.....	54	7,683	17,254	10,921	79,509	
1937.....	6	1,875	.....	.....	.....	108,170	377	396	235	.....	75	6,374	7,973	18,894	142,494	
1937.....	.....	.....	.....	.....	.....	91,399	335	452	233	.....	76	5,331	18,873	21,931	138,631	
1938.....	6	2,261	.....	.....	.....	122,093	744	181	359	.....	169	17,537	10,837	15,832	167,732	
1938.....	.....	.....	.....	.....	.....	86,490	716	136	351	.....	99	14,284	12,447	17,102	131,625	
1939.....	4	1,817	.....	.....	.....	71,068	412	206	329	.....	133	16,125	14,580	7,437	110,290	
1939.....	.....	.....	.....	.....	.....	36,957	285	32	306	.....	82	6,302	19,256	4,903	68,103	
1940.....	4	1,896	.....	.....	.....	89,142	810	238	320	21	91	12,744	4,085	15,167	122,618	
1940.....	.....	.....	.....	.....	.....	48,535	494	101	294	.....	40	7,452	4,315	2,369	63,600	
1941.....	2	1,355	.....	.....	.....	115,342	1,006	148	667	.....	179	25,165	5,558	23,203	171,268	
1941.....	.....	.....	.....	.....	.....	50,238	324	73	693	.....	104	16,067	6,193	6,236	80,133	
1942.....	1	1,505	.....	.....	.....	95,062½	745	104	144	.....	60	10,280	1,431	21,364	129,240½	
1942.....	.....	.....	.....	.....	.....	24,623	577	82	129	.....	19	6,189	1,446	10,295	43,360	
1943.....	1	1,449	.....	.....	.....	66,855½	223	591	208	.....	135	12,270	16,093	17,376	113,751½	
1943.....	.....	.....	.....	.....	.....	13,301	72	437	64	.....	25	6,596	23,347	15,892	59,734	

NOTE.—Figures shown in roman are packs from fish caught at Rivers Inlet or Smiths Inlet. Figures shown in italics are actual packs irrespective of where fish taken and not including fish shipped out for canning in other districts. Licences issued include transfers from other districts.

## STATEMENT No. 5—PACK OF CANNED SALMON IN THE FRASER RIVER DISTRICT—1933-1943

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned								Totals	
							Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink		
		G.N.	Troll	P.S.	D.S.	T.N.									cases	cases
1933	10	1,685	110	64			53,481	5,701	426	4,554	13,299		25,715	143,058	77,330	323,564
1934*	11	1,803	98	105			145,579	5,495	263	11,072	22,566		30,751	35,847	219,331	470,904
1934†							133,159	4,713	173	10,760	1,607		10,991	342	103,081	264,826
1935*	10	1,663	124	108			76,415	5,181	326	6,783	7,701		63,933	182,528	72,353	415,220
1935†							57,212	4,205	212	4,984	350		24,600	111,328	8,227	211,118
1936*	11	1,784	118				165,651	7,128	461	8,426	20,647	6	51,243	23,842	188,538	465,942
1936†							164,408	6,680	310	8,142			22,572	2	30,663	232,777
1937*	10	2,082	190	58			103,137	3,877	226	1,940	19,065	15	25,618	252,416	119,254	525,548
1937†							66,583	3,622	84	1,738	1,354		11,242	87,897	20,934	193,469
1938*	2	319	190	112			217,882	4,592	413	1,532	21,923	72	54,314	29,862	181,444	512,034
1938†							169,430	3,754	32	508			28,687	63	49,835	252,322
1939*	10	2,161	210				73,216	5,092	475	1,511	32,833	86	48,120	204,681	143,020	509,034
1939†							43,294	4,466	448	1,094	8,428	69	17,144	108,608	42,480	225,986
1940*	10	2,237	212				121,080	4,036	311	1,042	13,627	178	47,397	13,243	178,860	379,774
1940†							86,215	3,411	279	1,770			12,369	12	40,056	143,256
1941†	11	2,025	195				149,716	7,132	1,285	25,507		248	28,260	102,799	90,274	405,221
1941*							196,871	8,290	1,425	26,396	18,466	315	91,571	179,071	360,623	883,028
1942†	12	2,754	406				418,491	2,396	324	6,982		314	10,559	136	82,586	521,788
1942*							474,035½	2,856	688	7,552	22,999½	314	34,004	9,075	264,736	816,260
1943†	11	2,535	476				28,938	1,059½	237½	2,181½		246	8,391	30,394	53,954	125,401½
1943*							72,507	1,393½	646½	2,852½	14,059½	291	38,747	102,492½	127,450	420,442½

\* Represents actual pack, regardless where caught.

† Represents pack of Fraser fish, regardless where canned.

NOTE.—Licences issued include transfers from other districts. 1936† pack of Sockeye on Fraser, 164,408 cases, does not include 16,611 cases Sockeye caught on Fraser and exported and canned in Puget Sound canneries. 1940† pack of Sockeye on Fraser, 86,215 cases, does not include 4,536 cases Sockeye caught on Fraser and exported and canned in Puget Sound canneries. 1941: The above figures do not include packs of salmon canned in 1941 from Cold Storage stocks caught in 1940, particulars of which are given hereunder:

	Red Spring	Pink Spring	White Spring	Coho	Chums	Totals
1941 pack of 1940 catch.....	8	31	1,079	39,104	6,339	46,561



STATEMENT No. 6—PACK OF CANNED SALMON OF PUGET SOUND, U.S.A., FROM  
1933 to 1943

Year	Number of canneries operated	Spring	Sockeye	Coho	Chum	Pink	Steelhead	Total
		cases	cases	cases	cases	cases	cases	cases
1933.....	19	20,869	125,738	44,568	37,039	543,340	222	771,776
1934.....	20	14,398	352,579	69,254	73,337	3,606	.....	513,174
1935.....	14	9,737	54,677	71,985	15,604	377,445	.....	529,448
1936.....	9	6,328	59,505	29,119½	80,831½	1,345	.....	177,201
1937.....	14	8,968	60,259	32,559	17,417	327,833	.....	447,036
1938.....	13	2,787½	134,651	9,820½	7,852½	193	.....	155,304½
1939.....	14	2,439	43,511	54,773	14,505	275,485	.....	390,713
1940.....	9	1,991	63,890	30,478½	21,618	2,732	.....	120,718½
1941.....	9	4,706	110,605	45,968	21,170	153,686	.....	336,135
1942.....	10	1,460	263,458	6,582	3,896	710	.....	276,106
1943.....	10	2,872	19,116	26,219	224	61,479	.....	109,910

STATEMENT No. 7—STATEMENT OF HALIBUT LANDINGS—BRITISH COLUMBIA—  
1930—1943

(Includes landings in United States bottoms)

	Cwt.
1930.....	254,796
1931.....	182,005
1932.....	168,847
1933.....	170,372
1934.....	182,602
1935.....	171,143
1936.....	168,121
1937.....	187,425
1938.....	193,488
1939.....	227,188
1940.....	239,043
1941.....	229,658
1942.....	243,915
1943.....	250,034

\* Figures for earlier years may be found in the annual report for 1940-41.

## STATEMENT No. 8—CANNED PILCHARD PACK—BRITISH COLUMBIA—1933-1943

	Cases		Cases
1933.....	2,946	1938.....	69,374
1934.....	35,437	1939.....	7,300
1935.....	27,184	1940.....	59,166
1936.....	35,007	1941.....	58,038
1937.....	40,975	1942.....	46,451
		1943.....	101,356

NOTE:—For earlier figures see departmental report for 1940-41.

STATEMENT No. 9—PRODUCTION FISH OIL AND MEAL—BRITISH COLUMBIA,  
1933-1943

Year	From Pilchards		From Herring		From Whales			From Other Sources*	
	Meal and fertilizers	Oil	Meal	Oil	Whale- bone and meal	Fertil- izer	Oil	Meal and fertilizer	Oil
	tons	gals.	tons	gals.	tons	tons	gals.	tons	gals.
1933....	1,108	275,879	4,078	316,213	249	223	509,310	1,596	187,560
1934....	7,626	1,635,123	2,870	104,710	340	631	813,724	2,458	337,025
1935....	8,681	1,649,392	5,262	306,767	211	354	426,772	2,147	247,437
1936....	8,715	1,217,097	10,985	782,499	332	687	763,740	3,148	335,969
1937....	8,483	1,707,276	14,427	1,283,658	268	527	662,355	2,720	294,546
1938....	8,891	2,195,850	9,624	929,158	273	490	543,378	2,491	228,157
1939....	906	178,305	16,462	1,366,607	.....	.....	.....	3,004	283,504
1940....	4,853	877,556	24,264	1,700,819	181	434	361,620	3,526	285,314
1941....	10,473-2	1,789,708	8,757-5	584,157	271	577	566,505	5,081-6	390,939
1942....	11,550	1,622,840	10,898	643,577	130	205	255,556	4,837	263,481
1943....	15,456-4	2,233,281	7,126-5	675,002	62	90	134,553	2,315-9	156,808

\* Salmon and halibut offal, gray fish, and anchovies.

## STATEMENT No. 10—NUMBER OF WHALES LANDED—BRITISH COLUMBIA—1933-1943

Species	1933	1934	1935	1936	1937	1938	1940	1941	1942	1943
Sperm.....	190	265	175	311	265	252	126	233	130	69
Sulphur.....	1	.....	6	3	1	4	2	1	1	.....
Fin.....	17	71	20	48	44	50	90	67	25	15
Hump.....	.....	14	1	14	7	4	2	27	7	7
Sei.....	1	.....	.....	2	.....	.....	.....	.....	.....	.....
Totals.....	209	350	202	378	317	310	220	328	163	91

\* No whaling plants operated in 1939.

## STATEMENT No. 11—STATEMENT OF LICENCES ISSUED FOR SALMON CANNERIES AND SALMON FISHING GEAR (NOT INCLUDING LICENCES TO CAPTAINS AND ASSISTANTS ON SALMON SEINE-BOATS OR ASSISTANTS ON SALMON GILL-NET BOATS) BRITISH COLUMBIA—1933-1943

Kind of Licence	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943
<i>District No. 1—</i>											
Salmon cannery.....	10	11	10	11	10	10	10	10	11	12	11
Salmon trolling.....	110	98	124	118	190	190	210	212	195	400	484
Salmon gill-net.....	1,685	1,803	1,663	1,734	2,032	2,319	2,161	2,237	2,025	2,670	2,613
<i>District No. 2—</i>											
Salmon cannery.....	29	31	26	27	20	22	18	20	17	14	14
Salmon purse-seine.....	55	109	102	99	82	100	93	131	95	105	87
Salmon drag-seine.....	11	9	9	9	9	9	9	9	9	9	9
Salmon trolling.....	882	937	930	964	916	958	863	737	791	706	903
Salmon gill-net—											
Low Inlet.....	59	67	58	74	76	80	135	106	61	25	83
Naas River.....	297	335	310	349	321	309	289	254	281	170	199
Skeena River.....	1,218	1,164	1,053	970	856	1,049	844	926	981	765	749
Rivers Inlet.....	1,603	1,899	1,699	1,802	1,490	1,796	1,550	1,518	1,070	640	1,211
Smiths Inlet.....	359	39	324	408	385	465	267	378	285	107	238
Bella Coola.....	228	285	265	265	261	242	216	192	161	155	194
Butedale.....	43	48	41	57	18	80	102	148	78	3	88
Namu.....	107	141	129	146	137	159	148	134	93	109	89
Queen Charlotte Islands.....	2	19	.....	24	4	53	9	14	8	42	8
Total, salmon gill-net, District No. 2..	3,916	4,377	3,882	4,095	3,548	4,233	3,560	3,670	3,018	2,016	2,859
<i>District No. 3—</i>											
Salmon cannery.....	10	7	7	8	7	6	7	8	8	4	5
Salmon trap-net.....	8	8	8	7	5	5	5	5	5	5	5
Salmon purse-seine.....	183	187	191	188	209	200	241	219	238	207	203
Salmon drag-seine.....	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Salmon trolling.....	1,888	2,064	2,053	2,429	2,056	2,305	2,874	2,273	2,094	2,737	2,959
Salmon gill-net.....	512	646	673	741	466	573	781	485	459	567	571
<i>Whole Province—</i>											
Salmon cannery.....	49	49	43	46	37	38	35	38	36	30	30
Salmon trap-net.....	8	8	8	7	5	5	5	5	5	5	5
Salmon purse-seine.....	236	296	293	287	291	300	339	350	333	312	290
Salmon drag-seine.....	31	9	9	9	9	9	9	9	9	9	9
Salmon trolling.....	2,880	3,099	3,107	3,511	3,162	3,453	3,947	3,222	3,080	3,843	4,346
Salmon gill-net.....	6,113	6,826	6,218	6,620	6,096	7,125	6,502	6,392	5,502	5,253	6,043

Note.—Salmon cannery licences shown above were issued by the Provincial Fisheries Department.

## STATEMENT No. 12—PACK OF SOCKEYE SALMON FROM RUNS TO FRASER RIVER, 1933-1943

Year	Fraser River Pack	Canadian Traps in Juan de Fuca Straits	Puget Sound Pack	Total Cases*
1933.....	43,745	8,721	125,738	178,204
1934.....	133,159	6,117	352,579	491,855
1935.....	57,212	5,610	54,677	117,499
1936.....	164,408	3,837	59,505	227,750
1937.....	66,583	6,152	60,259	132,994
1938.....	169,430	3,784	139,173	312,387
1939.....	43,249	4,290	43,511	91,050
1940.....	86,215	2,247	63,890	152,352
1941.....	149,715½	9,563	110,605	269,883½
1942.....	418,491	8,488	263,458	690,437
1943.....	28,938	1,339	19,116	49,393

\* Figures represent pack of Fraser River sockeye, regardless where canned.

STATEMENT No. 13—STATEMENT OF FISHERY LICENCES—BRITISH COLUMBIA  
SEASON 1943-1944

Variety of Licences	ISSUED			TRANSFERS			OPERATING		
	Whites	Indians	Chinese	Cancelled	Total	Whites	Indians	Chinese	Cancelled
Salmon Trap-net.....	5	9	.....	.....	5	.....	.....	.....	.....
Salmon Drag seine.....	264	23	.....	.....	290	264	23	.....	.....
Salmon Purse seine.....	3,288	1,520	.....	3	4,811	.....	.....	.....	3
Salmon Gill-net.....	3,635	677	1	2	4,320	861	1,891	1	2
Salmon Trollng.....	243	133	7	1	376	26	677	7	1
Asst. Salmon Gill-net.....	117	96	.....	.....	213	18	136	.....	.....
Capt. Salmon Purse-seine.....	1,011	613	.....	.....	1,625	.....	96	.....	.....
Asst. Salmon Purse-seine.....	1,229	130	8	1	1,368	1	613	.....	1
Cod.....	72	4	.....	.....	76	.....	131	8	1
Crab.....	1,800	241	.....	.....	2,041	7	242	.....	.....
Grayfish.....	157	11	.....	1	168	.....	12	.....	.....
Miscellaneous.....	1	45	.....	.....	46	1	45	1	.....
Abalone.....	61	2	.....	.....	63	2	2	.....	.....
Small Dragger.....	39	1	.....	.....	40	.....	1	.....	.....
Smelt.....	31	.....	.....	.....	31	39	.....	.....	.....
Pitchard Purse-seine.....	21	2	.....	.....	23	.....	31	.....	.....
Capt. Pitchard Purse-seine.....	181	2	.....	.....	183	.....	21	.....	.....
Asst. Pitchard Purse-seine.....	67	2	.....	.....	69	181	2	.....	.....
Herring Purse-seine.....	42	5	.....	.....	47	67	2	.....	.....
Capt. Herring Purse-seine.....	403	41	.....	1	445	42	5	.....	.....
Asst. Herring Purse-seine.....	17	1	.....	.....	18	403	41	.....	1
Herring Gill-net.....	11	1	.....	.....	12	17	1	.....	.....
Herring Pound.....	288	207	.....	.....	495	11	207	.....	.....
Capt. Halibut or Black Cod.....	9	.....	.....	.....	9	288	1	.....	.....
Capt. Halibut Boat for Bait.....	2	.....	.....	.....	2	9	.....	.....	.....
Capt. Tuna Boat.....	1	.....	.....	.....	1	2	.....	.....	.....
Asst. Tuna Boat.....	2	.....	.....	.....	2	.....	.....	.....	.....
Whaling.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals.....	12,997	3,766	16	10	16,789	915	377	16	10
							4,143		
						13,912			
					1,259				
									18,081

Indian permits, 1,412

# LICENCES ISSUED BY PROVINCIAL FISHERIES DEPARTMENT 1943 SEASON

Kind	Number	Kind	Number
Salmon Cannery .....	32	Fish Offal Reduction Plants..	10
Pilchard Cannery .....	5	Dogfish Reduction Plants....	3
Tierced Salmon Plants.....	2	Fish-buyers' Licences .....	467
Cold Storage Plants.....	9	Herring Cannery .....	22
Whale Reduction Plants.....	1	Herring Reduction Plants....	13
Pilchard Reduction Plants....	7	Pickled Herring Plants.....	7
Shellfish Cannery .....	4	Non-tidal Fishing Licences..	105
Fish Liver Reduction Plants...	9	Sturgeon Fishing Licences...	1

## STATEMENT No. 14—STATEMENT OF DIFFERENT SPECIES OF SALMON AND METHOD OF CAPTURE REPORTED BY OPERATORS OF SALMON PURSE-SEINES, DRAG-SEINES AND TRAP-NETS AND BY SALMON CANNING, CURING AND COLD STORAGE ESTABLISHMENTS, OF GILL-NET AND TROLL CAUGHT FISH—BRITISH COLUMBIA—SEASON 1943

Method of Capture	Sockeye	Spring	Blue-back	Steel-head	Cohoe	Pink	Chum	Total
Troll.....	4,995	459,094	716,771	1,152	1,406,157	75,910	106,473	2,770,552
Gill-net.....	1,831,266	590,430		106,854	473,702	3,220,620	1,722,705	7,945,577
Purse-seine.....	159,093	10,825		947	292,520	6,137,679	3,087,568	9,688,632
Drag-seine.....	54,474			5	13,599	6,270	3,746	78,094
Trap-net.....	16,926	16,063		1,105	27,843	33,699	1,263	96,899
Totals.....	2,066,754	1,076,412	716,771	110,063	2,213,821	9,474,178	4,921,755	20,579,754

## STATEMENT No. 15—STATEMENT OF NUMBER OF SALMON CAUGHT BY PURSE-SEINES, SHOWN BY SEINING AREAS BRITISH COLUMBIA—SEASON 1943

Area No	Sockeye	Spring	Blue-back	Steel-head	Cohoe	Pink	Chum	Totals
1.....					1,260		17,886	19,146
2.....	15				6,328	20	311,257	317,620
3.....	1,768	499		14	1,798	160,390	40,760	205,229
4.....								
5.....	25,740	115		26	20,793	223,526	36,469	306,669
6.....	27,271	1,224		94	33,640	1,014,783	170,103	1,247,115
7.....	2,520	477		295	16,592	1,768,100	612,088	2,400,072
8.....	1,103	86		138	4,607	663,602	31,677	701,213
9.....	63	43		19	2,422	141,433	65,670	209,650
10.....		1			496	52	6,747	7,296
11.....					2,325	1	25,946	28,272
12.....	69,477	4,097		281	95,205	1,677,517	654,056	2,500,633
13.....	22,714	2,169		65	32,496	478,125	585,530	1,121,099
14.....	16	100			2,047	513	76,200	78,876
15.....	3	3			317	3	41,549	41,875
16.....	49	30			1,973	749	20,377	23,178
17.....								
18.....	22	10			820	460	9	1,321
19.....								
20.....					308			308
21.....	1,977	1,192			12,247	6,255	2	21,673
22.....	5	5		1	2,263	1,349	10,372	13,990
23.....	947	722		12	15,391	792	61,406	79,270
24.....	5,408	50			7,127		50,984	63,569
25.....		1			8,595		151,988	160,584
26.....					3,051		47,983	51,034
27.....		1		2	20,419	9	68,509	88,940
Totals.....	159,093	10,825		947	292,520	6,137,679	3,087,568	9,688,632



STATEMENT No. 16—STATEMENT SHOWING PACKS OF CANNED SALMON, 1932-1943  
WITH QUANTITIES GRADED SECOND QUALITY AND PERCENTAGES

—	Sockeye	Spring	Steel-head	Blue-back	Coho	Pink	Chum	Total
1932 Pack, cases...	284,355	76,060	1,168	28,505	160,466	223,716	306,761	1,081,031
Grade B, cases...	3,355	1,234		164	333	119	3,083	8,288
Per cent. ....	1.179	1.622		.575	.207	.053	1.005	.766
1933 Pack, cases...	258,107	20,266	1,459	21,763	137,289	532,558	293,630	1,265,072
Grade B, cases...	494			10	873	15,149	887	17,413
Per cent. ....	.191			.045	.635	2.844	.302	1.376
1934 Pack, cases...	377,882	29,784	1,282	29,556	195,874	435,364	513,184	1,582,926
Grade B, cases...	21,620	139	5		962	4,085	1,127	27,938
Per cent. ....	5.721	.466	.390		.491	.938	.219	1.764
1935 Pack cases...	350,444	21,920	596	15,319	216,173	514,966	409,604	1,529,022
Grade B, cases...	3,435	659			3,840	20,528	5,601	34,063
Per cent. ....	.980	3.006			1.776	3.986	1.367	2.227
1936 Pack, cases...	415,024	29,854	1,068	33,718	212,343	591,532	597,487	1,881,026
Grade B, cases...	13,725				483	29	5,265	19,502
Per cent. ....	3.307				.227	.005	.881	1.036
1937 Pack, cases...	325,774	16,171	844	19,236	113,972	585,576	447,602	1,509,175
Grade B, cases...	65				68	27,282	3,212	30,627
Per cent. ....	.019				.059	4.659	.717	2.029
1938 Pack, cases...	447,453	15,531	1,035	27,417	273,906	400,876	541,812	1,707,830
Grade B, cases...	16,361			563	1,111	1,413	1,583	20,524
Per cent. ....	3.656			.206	.405	.352	.292	1.201
1939 Pack, cases...	269,888	16,097	797	48,209	196,887	620,595	386,584	1,539,057
Grade B, cases...	3,444½	11	20	17	142½	45,667	1,068	50,370
Per cent. ....	1.276	.068	2.509	.035	.072	7.358	.276	3.272
1940 Pack, cases...	366,403	17,741	1,205	23,277	201,467	213,911	643,443	1,467,227
Grade B, cases...	1,778½	57		13	461	2,530	3,298½	8,138
Per cent. ....	.485	.321		.054	.228	1.182	.512	.554
1941 Pack, cases...	445,297	50,476	3,454	30,027	361,380	427,766	920,470	2,248,870
Grade B, cases...	1,186½	152½	2	33	539½	64,866	25,161½	91,941
Per cent. ....	0.260	0.301	0.057	0.109	0.149	15.163	2.733	4.088
1942 Pack...	666,571½	24,744½	4,649	23,265½	187,873½	270,622½	633,834	1,811,560½
Grade B, cases...	39,753½	256		87	693½	8,676	17,654	67,120
Per cent. ....	5.963	1.034		0.373	0.369	3.205	2.785	3.705
1943 Pack...	164,889	10,658	3,095	14,059½	171,983	530,188½	363,347½	1,258,221½
Grade B, cases...	227½	69			3	25,837½	7,823	34,760
Per cent. ....	.137	.647			.002	4.873	2.153	2.762

STATEMENT No. 17—RECAPITULATION OF FISH LIVER AND FISH VISCERA  
SUMMARIES 1943

Species	Purchases		In Cold Storage		Liver Oil		Total Value Marketed or Prepared for Market
	Pounds	Value to Fishermen	Pounds	Value	Pounds	Value	
		\$		\$		\$	\$
Gray God Livers.....	32,886	3,193	2,757	191	10,592	8,467	8,658
Halibut Livers.....	174,946	113,231	12,656	8,887	24,525	155,089	163,976
Halibut Viscera.....	255,588	28,839	136	19	14,107	63,502	63,521
Black Cod Livers.....	53,276	60,520	3,801	2,045	7,601	66,209	68,254
Black Cod Viscera.....	47,270	9,497	533	32	2,716	13,851	13,883
Ling Cod Livers.....	149,555	191,782	38,163	37,353	13,927	170,516	207,869
Ling Cod Viscera.....	157,109	13,526	11,907	1,010	10,685	4,083	5,093
Red Cod Livers.....	35,668	24,692	11,335	5,391	356	8,875	14,266
Red Cod Viscera.....	7,527	859	4,026	443	194	87	530
Dogfish Livers.....	5,121,186	1,344,858	55,352	18,982	3,509,213	2,028,875	2,047,857
Soupin Shark Livers.....	31,922	86,300	6,386	21,045	12,926	78,886	99,931
Ratfish Livers.....	81,509	3,814	11,793	567	43,527	4,123	4,690
Mudshark Livers.....	414,890	64,834			245,444	78,298	78,298
Skate Livers.....	13,111	514			4,118	1,198	1,198
Mixed Shark Livers.....	60,122	6,012			40,762	24,050	24,050
Bass Livers.....	17	1	17	1			1
Mixed Cod Viscera.....	7,499	600			280	1,350	1,350
Mixed Low Potency Oil.....					7,835	1,960	1,960
Mixed High Potency Oil.....					4,070	1,638	1,638
Salmon Livers.....	18,100	937	2,165	140	411	349	489
Total Values.....		1,954,009		96,106		2,711,406	2,807,512

## SPAWNING REPORT, 1943

As the industry was advised early in the season, it was anticipated that the run of salmon during the year would be below normal. This forecast was borne out by the year's experience, with the exception of pinks in the Central and Bella Coola areas.

Conditions in most streams during the year from the standpoint of sufficient water to permit easy access of salmon to the spawning grounds were unusually good, except in some of the streams in the lower part of the province, and conditions generally in spawning streams were such as to justify the expectation of a good season's hatch. An encouraging factor was the absence of severe freshets which sometimes occur just after the spawning has finished, with resultant great damage.

Sockeye supplies on the spawning grounds throughout the province were not as satisfactory as hoped, although conditions were reasonably good at the Naas, Skeena, Rivers Inlet, and Smiths Inlet areas. The Birkenhead and upper Fraser spawning grounds at Chilco Lake and Stellaco River were particularly satisfactorily seeded with this variety compared with recent cycles. The escapement was better than might be inferred from the small pack. The seeding by springs was on the whole unsatisfactory. The coho supplies were found to be fair, with some areas quite good. The seeding by pinks was generally fair but in the Central and Bella Coola areas the escapement was very heavy. The supplies of chums were reasonably good, save in the areas along the west coast of Vancouver Island and the east coast of the Queen Charlotte Islands.

## QUEEN CHARLOTTE ISLANDS

Sockeye are not fished commercially here. The escapement, however, to such streams as the Ain, Awun, Naden, and Copper Bay rivers was quite good. Coho seeding was fairly good in Skidegate, Copper Bay, and Tl-ell river areas, as well as in Massett and Naden Harbour streams. In other portions of the Queen Charlottes, however, the seeding appears to have been light. This is the "off" year for pinks and none was found on the spawning grounds.

The chum supplies were not up to expectations. In the Naden, Ain, and Awun rivers the run was practically a failure. Seeding in the west coast streams is reported as light, with the exception of the streams at Nesto Inlet, Security Cove, and Peel Inlet. At Skidegate Inlet the supplies found are reported as being a medium to a heavy seeding. The Cumshewa streams were generally well seeded. The supplies in Selwyn Inlet streams were light. This also applies to the streams in Atli and Crescent Inlets. The seeding at Salmon creek is reported as very heavy, the best in probably the last twenty years, Sedgwick Bay medium, Hutton Inlet a failure, Werner Bay a failure, Skaat Harbour light. In the streams from Island Bay to Ikeda Bay, including Bag Harbour, Tangle Cove, Oyster Cove, George Bay, Huston Inlet, and Harriet Bay the seeding ran from good, medium, to heavy.

## LOWER NAAS AREA

Observations covering the lower portion of the Naas River and its tributaries suggest a smaller run of sockeye than average, although the inspecting officer states that the escapement was very satisfactory, due partly to weather conditions. The escapement to the Tseax River was a good average one, but that to Bear Lake was poor. The inspecting officer comments on the small size of the individual fish passing upstream after July. The escapement of springs is reported as heavy. The coho run is reported as a good average. The pink escapement is reported as very good, partly the result of less intensive fishing operations by purse-seines. The chum seeding was above average,

especially to the stream at the head of Warke Canal. The escapement to Toon River is described by the inspecting officer as the heaviest he has seen in the Naas area.

#### UPPER NAAS AREA

The main sockeye spawning areas of this system were not inspected by an officer of the department, but by a man who has had many years' experience in this work, having accompanied both the officers of the federal and provincial fisheries departments over the areas for many years. He has had more experience in this area than any officer of the Fisheries Department. The seeding by the early run of sockeye is reported as being rather light and disappointing. The seeding by the late run, however, was found to be heavy and similar to that reported in 1938, and better than in the years 1939 and 1942. The officer suggests that, taking the seeding as a whole, it could be considered as fairly good, although a little under average. The seeding by springs is reported as the best in the twenty-one years' experience of the inspecting officer. The coho supply is better than average, the fish being individually large. The fishway at Meziaden Lake was cleaned out and left in good condition. Another portion of the old cribbing had given way, but the fishway itself is functioning quite satisfactorily.

#### SKEENA AREA

In the Babine Lake area, the principal sockeye spawning ground of this watershed, the seeding by this variety, although in general satisfactory, was below that of 1939. Some of the principal spawning streams such as Fulton and Morrison rivers, received a heavy seeding, although in the former there appears to have been some waste of eggs. The seeding at Fifteen Mile Creek was definitely poor. The supplies in Babine River generally were quite good. The inspecting officer called attention to the considerable percentage of small individual sockeye on the spawning grounds. The seeding by springs in the Babine River was light to medium, and the coho seeding average. Pink seeding, however, was very heavy, the fish being individually large.

In the Morice river and lake system, which is tributary to the Skeena River, conditions for observation were poor. The sockeye seeding, however, appeared to be light. The spring seeding also was fairly light but the coho supply good.

In the Kalu Lake system, also tributary to the Skeena, a very good seeding of sockeye was found at the head of Kalum Lake. The supplies were greater than in the year 1939 when the seeding was good. There was also a good escapement to Cedar River and Clear Creek. The individual fish in the Kalu system were large.

Lakelse Lake, an important part of the Skeena system, is primarily a sockeye and pink area. The seeding in Williams Creek, which is the principal spawning ground for the former variety, was good. The seeding at Schullabuchan Creek was good, being an improvement over the brood year. The supplies in Salmon and Granite creeks were not up to expectations, although these streams are small and not as suitable as the first two mentioned. The pink supply is reported as being very heavy and an improvement over the brood year, when a heavy escapement took place.

In the Oestahl River system the sockeye seeding was only fair, being less than in 1939. There was a heavy seeding of spring salmon in Johnson Creek. The coho supplies appear to have been satisfactory. There was a very good seeding of pinks in the main Oestahl River and its tributaries, an improvement over the cycle year of 1941. The supply of chums in the Oestahl River and its tributaries is reported as fair, though not as good as in the brood year.



## LOWE INLET AREA

The sockeye seeding is reported as being good, due to less intensive fishing and favourable water conditions. The coho supplies were average. Pinks showed a decided improvement over the brood year as did chums.

## BUTEDALE AREA

Weather conditions were very favourable for the ascent of salmon to the spawning grounds, streams being at all times well supplied with water. High water made the inspection very difficult. The sockeye supply in the southern portion of the area was below average. The Kitlope River at the head of Gardner Canal, however, received a satisfactory seeding. The coho escapement to the southern part of the area was lighter than in the brood year but conditions were just the reverse in the northern section. The seeding generally of this variety was satisfactory. The pink supply is reported as being exceptionally large and is described by the inspecting officer as "unheard of in an off year, having only been exceeded in the past eleven seasons by the seeding of 1936". The seeding at Quaal River, Bish Creek, and Kainet River is reported as very heavy. While the chum seeding was better than that of the brood year, it could only be classified as light to medium. Kainet River was the only stream which received a heavy supply.

## BELLA BELLA AREA

The early sockeye seeding was reported as light to medium, with some improvement in the later runs. The total, however, was below that of the brood year. The same condition applies to the coho supply. A very heavy seeding of pinks occurred and all major streams are reported as being filled to spawning capacity, the seeding showing improvement generally over the brood year. The chum seeding was abundant, with all large streams receiving plentiful supplies. Spawning conditions from the standpoint of water were good.

## BELLA COOLA AREA

The sockeye seeding was not heavy but is reported by the inspecting officer as quite satisfactory, in view of the run. One outstanding feature this season was the large percentage of small fish, the so-called 'runts'. It is estimated that approximately 60 per cent of the total run was made up of these small individuals, not over twelve inches in length. A disturbing factor of the Bella Coola spawning ground situation is the report that the big flood of 1936 altered the course of one of the glacial streams which up to that time had drained into Knight's Inlet. It now carries deposits of silt into the Atnarko River and this settles over a portion of the salmon spawning grounds frequented by the larger sized fish. Conditions in the Kimsquit River were reasonably good.

The seeding by springs was satisfactory in the Bella Coola system, but rather light in the Dean River area. The coho supplies are considered adequate.

The outstanding feature of the spawning inspection was the very large quantities of pinks found over the whole district supervised by the Bella Coola inspector. The officer observes: "It is a remarkable return from the cycle year's heavy seeding. Practically all streams tributary to the Bella Coola and Atnarko were literally loaded with spawning pinks, this species reaching points eighty miles distant from salt water in appreciable numbers."

Spawning conditions throughout the season were favourable and to the date of inspection no freshets had occurred. The chum seeding was also heavy throughout the district.

## RIVERS INLET AREA

The usual two inspections of the sockeye spawning grounds were made in this area—the first between September 6 and 10, and the second between



October 12 and 20. The seeding generally was found to be poorer than in the brood years, 1938 and 1939. In some rivers, however, the conditions were on a par or even better, whilst the spawning in two streams was found to be very disappointing.

At Waukwash River the supply was not as good as in 1938, but equal to that of 1939. The inspector observes that the stream was generally well seeded and one of the best seen in 1943. The seeding at Indian River was equal to that of the two brood years. Conditions at Asklum River were satisfactory; in fact, the Asklum received the best seeding of any stream in the area, and was better than in the brood years. The situation at Genesi River was most disappointing. At Owekano River, which is one of the main spawning areas, the seeding was definitely poor.

A later report has been received from a one-time employee at the department's hatchery at Rivers Inlet, with regard to conditions at Whonnock River, which shows that there was an average seeding of sockeye in that important stream, although the fish were individually small.

With regard to the streams tributary to Rivers Inlet proper, and those streams tributary to Owekano Lake, to which fall salmon proceed, the information is that the coho supplies were light, the pinks very good, but the chum supplies only medium.

#### SMITHS INLET AREA

The sockeye seeding is reported as being equal to that of 1938, when the supplies were found to be satisfactory. There was a good escapement to the Geluck River and a satisfactory one to the Delabah, two important sockeye streams of the system.

The remarks with regard to the fall varieties in the Rivers Inlet area apply to this district also.

#### FRASER RIVER WATERSHED

*Prince George Area.*—Encouraging supplies of sockeye were found in the Fraser-Francois Lake watershed, the quantities being estimated at 13,000 compared with 2,000 in the brood year. Most of this seeding was in the Stellaco River. In the Stuart Lake system the seeding is estimated as five times greater than that of the brood year, although the quantities are still not great compared with early runs of this variety. The supplies of springs in the Nechaco and Stuart Lake system were disappointing.

*Quesnel Area.*—In the Chilco system, which is the main sockeye spawning ground of this area, the supply of sockeye was found to be approximately 300 per cent greater than that of the brood year. In the Quesnel Lake system no sockeye were observed. In the Bowron Lake system there was an increase of approximately 100 per cent over the spawning of the brood year. The supply of springs at Chilcotin was an average one. The seeding in the Quesnel Lake system was fair. This also applies to the Bowron, Cottonwood, and Blackwood River systems.

*Kamloops Area.*—At Raft River the sockeye seeding showed considerable improvement over that of the brood year. The supplies in the Shuswap area, including Little River and Adams River, were disappointing, the inspecting officer estimating only 5,000 individuals in the former and 12,000 in the latter. The supply of springs was about average, the fish arriving on the spawning beds in excellent condition. The quantities of cohoes on the spawning grounds were estimated to be normal.

*Pemberton Area.*—The inspecting officer reports a remarkably heavy seeding of sockeye in the Birkenhead River system. In Seton Creek some 800 spawning sockeye were observed. It has been noted in previous seasons that

the conditions at the falls in the Fraser River, at the mouth of Bridge River, appear to affect the quantities of sockeye entering the Seton Lake system. The seeding by springs in the Squamish area was light, but there was a fair average in the Pemberton system. Satisfactory supplies were observed in the Seton Creek area. The coho supplies were disappointing on the whole, although the run extends into January and February and the inspection in the fall does not cover the whole seeding. The pink supplies were disappointing. The seeding by chums in the Squamish River system was good. This also applies to the streams tributary to the west side of Howe Sound.

*Chilliwack Area.*—In the Chilliwack-Cultus Lake section the only important sockeye spawning beds are at Vedder River and Cultus Lake. The supplies of sockeye were disappointing, the return to Cultus being estimated at approximately 12,000 fish, compared with 73,000 in the brood year of 1939. The spring seeding was light as was that of coho, although the upper waters of the Chilliwack River were fairly well stocked. Fair supplies of cohoes were observed in the main streams, including the Coquihalla River. The seeding of pinks was fairly heavy, although not quite equalling that of 1941. Supplies were found particularly abundant in the Chilliwack River and Jones and Popkum creeks. There was a satisfactory seeding of pinks in the Coquihalla. The chum seeding was an improvement over the brood year and fresh fish were still entering the stream at the time of inspection. A heavy seeding occurred in the Vedder and Chilliwack rivers, and Sweltzer Creek. Steelhead trout were unusually plentiful.

*Harrison Area.*—The sockeye seeding in this area, including the Mission portion of the district, has been light. This is also true of springs and cohoes. The pink and chum supplies, however, are reported as being quite heavy, particularly in the principal streams such as the Harrison and Chehalis rivers.

*Pitt Lake Area.*—A satisfactory supply of sockeye was observed in this system, estimated to be an improvement over the brood year. Only fair supplies of cohoes were found.

*Lower Fraser Area.*—Fair supplies of cohoes were found in the Serpentine and Nicomekl rivers, tributary to Mud Bay. In the smaller streams tributary to the Fraser, west of Chilliwack, excellent supplies of pinks were found at Whonnock Creek and a remarkably good showing in the North and South Alouette rivers, and Beaver River. Chums were exceptionally plentiful in Whonnock Creek and there was a fair seeding at Stave and Coquitlam rivers.

*North Vancouver Area.*—In the streams tributary to Burrard Inlet the seeding by springs was disappointing. The coho seeding was fair and the pinks not up to expectations. The chum supplies were also light.

#### ALERT BAY AREA

The sockeye supplies in the main spawning grounds such as the Nimpkish River, Keough River, Glendale Cove, Shushartie, Port Neville, Quatsi River, and MacKenzie River, were fair, and compared favourably with those of the brood year of 1939. Water conditions in the streams were favourable. Average supplies of spring salmon were observed at all streams except Quatsi River and Adams River. A medium seeding occurred in the case of cohoes at nearly all streams, with heavy supplies at Wakeman River, Viner and Salmon rivers. The pink seeding in mainland streams was the heaviest in ten years, practically all streams receiving large supplies. On the other hand, the seeding in the streams in the Vancouver Island section of the area was disappointing, being below that of the brood year. Heavy supplies of chums were found at Kingcome, Seymour, Salmon, and Viner rivers, those in the Viner River area being

particularly heavy. The remaining streams received from light to medium supplies. All streams were well supplied with water.

#### QUATHIASKI AREA

The streams tributary to Hayden Bay and Phillips Arm are the only ones frequented by sockeye. The seeding at Hayden Bay was equal to that of the cycle year, and an improvement was observed in Phillips River. The seeding by spring salmon is considered a fair average, Campbell, Phillips, and Salmon rivers being at least equal to that of the cycle year. The coho escapement is reported as considerably better than that of the previous cycle, to all spawning grounds, particularly those of the Campbell and Homalthe rivers, and Cumsack Creek, where the escapement was heavy. Even for an "off" year, the supply of pinks was found to be very disappointing, the only exception being the streams tributary to Bute Inlet, where a good escapement was observed, being a considerable improvement over that of the brood year. The chum supply was found to be disappointing and this is suggested as being possibly the result of flood conditions in 1939.

#### COMOX AREA

The seeding by springs in the Puntledge River was found to be satisfactory, being an increase over that of 1940, 1941, and 1942, although not equalling the average runs of 1936 to 1939. The coho seeding was light. The inspecting officer attributes this condition to the effect of the numerous freshets in 1940. An extremely heavy supply of pinks was reported in the Courtenay River system. The seeding was even better than in 1939. There were few to be found in other streams in the area, as this is the "off" cycle for pinks. In the brood year the seeding was poor even for this particular cycle. Generally speaking, only medium supplies of chum salmon were found, although they compared favourably with the seeding of the brood year. The best conditions were found in the Courtenay River system, although the seeding at Little Qualicum River is reported as excellent. At Big Qualicum River, however, the seeding was not as good as that of the brood year.

#### PENDER HARBOUR AREA

The sockeye seeding in the Saginaw Lake system was light but compared well with that of the brood year. The same conditions apply in the case of cohoes. There was a heavy seeding of pinks in the important Jervis Inlet area, particularly to Squaka River. At Deserted Bay River the supply was only fair, and in other streams in the district there was the usual light seeding. Chums were found in fair quantities in most of the larger streams, comparing well with the quantities showing in the brood year.

#### NANAIMO AREA

Cohoos were found in satisfactory quantities and the chum seeding was adequate. Other varieties of salmon do not frequent this area in commercial quantities.

#### LADYSMITH AREA

The coho seeding was equal to that of the brood year in the Nanaimo River system. In the Chemainus River and other creeks in the vicinity the supplies are reported as being excellent and an improvement over those of 1940. The seeding by springs in the Nanaimo River is reported as very satisfactory. Average quantities were also found in the Chemainus. The usual few pinks appeared in both the Nanaimo and Chemainus River systems. The chum seed-



ing in the Nanaimo River was heavier than that of the brood year. The supplies in the Chemainus River were also excellent. This also applies to the smaller adjacent streams which are frequented by chums.

#### COWICHAN AREA

The seeding by springs is reported as being satisfactory and the coho supply was good. The chum seeding was also quite satisfactory. Spawning conditions in the Cowichan River were very good. Salmon had no difficulty in passing over Skutz Falls via the fish ladder installed by the department. In fact, salmon were observed passing through the ladder at the rate of 1,500 per hour at times.

#### VICTORIA AREA

The coho supply to the various streams compared favourably with that of the brood year. This also applies to the chums in the Sooke and Demanuel rivers. In the smaller streams in the Sooke area the supply was below average. At Goldstream, however, the chum seeding was better than for many years, and the run was still continuing at the time of the last inspection.

#### ALBERNI AREA

The sockeye seeding in the Somass River system, which includes the Sproat and Great Central lakes and tributaries, has apparently not been as good as hoped. Due to high water conditions at Sproat Falls and Stamp River Falls the ascent of the salmon was made much easier. Only 5,400 sockeye were counted through the fishway during the fall, which is approximately 30 per cent of the runs counted in the same weir during each of the two preceding seasons. However, undoubtedly a much smaller percentage of the run used the fishway, in view of the favourable natural water conditions. Unfortunately, no inspection was made of the spawning grounds at the head of Anderson Lake, although a fair escapement of sockeye was observed passing upstream during the fishing season. The escapement at Hobarton River, tributary to Nitinat Arm, is reported as satisfactory. The seeding of the spring salmon beds in the principal streams such as the Somass, Nahmint, Sarita, Toquart, and Nitinat rivers is considered good, and spawning conditions favourable. A fair seeding of cohoes was observed in the Somass River system, as well as in the Nahmint, Toquart, Sarita, San Juan, and Nitinat rivers. The supply of chums was most disappointing but early closing of fishing provided a fair seeding in some of the streams. Generally speaking, however, the chum seeding was poor. Water conditions in the several streams were satisfactory.

#### CLAYOQUOT AREA

The sockeye supplies are reported as being medium in the Kennedy Lake and Clayoquot River systems—below those of the brood year. The seeding in the Megin river and lake system was not up to expectations. The seeding by springs is reported as the heaviest in the past four years, in all streams. The coho supplies were less than those of the brood year. A few pinks were observed, although this is not a pink area. The chum supplies, generally speaking, were found to be light, although varying greatly in the several streams.

#### NOOTKA AREA

The usual small seeding of sockeye was again observed, although this variety never appears in any material quantities. The spring supplies were found to be normal. This also applies to the coho variety. The chum escapement was much the same as that found in the years 1939 and 1940. The individual fish, however, averaged only about seven pounds in weight.



## KYUQUOT AREA

The seeding by springs is reported as only fair. The coho supply is reported as being below that of the brood year. For an "off" year the seeding by chums was good, showing considerable improvement over that of the brood year.

## QUATSINO AREA

Sockeye seeding was found below normal but Quatsino is not an important sockeye area. A good average supply of springs was observed at Marble Creek, which is the most important stream for this variety. Average seedings also occurred at Main River and Klaskish River. Medium supplies of coho were seen in all the streams in Winter Harbour and Quatsino Sound, with the exception of Main River and Koprino River. The seeding in the outside streams, between the entrance to Quatsino Sound and Cape Scott, such as the Macjack, San Josef, and Fisherman's rivers is reported as below average. This being an "off" year for pinks, very few were observed. The chum supply was found to be medium. It is reported to be equal to that of an average year, except to most of the streams in the West Arm of Quatsino Sound and to Jim's Creek and Klaskhino Inlet. However, the seeding was an improvement over that of 1939.

## APPENDIX No. 3

## ANNUAL REPORT ON FISH CULTURE

*By J. A. RODD, Director of Fish Culture*

Fish cultural operations in 1943 were carried on by the Department of Fisheries in Nova Scotia, New Brunswick and Prince Edward Island where the fisheries are entirely, or to a large extent, under federal administration. Thirteen main hatcheries, six rearing stations, six salmon retaining ponds and several egg collecting camps were operated with a total output from these establishments of 26,279,870, over 73 per cent of which was distributed in the fingerling and older stages. The output by species, hatcheries and provinces was:

STATEMENT BY SPECIES OF THE FISH DISTRIBUTED DURING THE YEAR ENDED  
DECEMBER 31, 1943

Species	Fry	Advanced fry	Fingerlings	Yearlings and older	Total distribution
<i>Salmo salar</i> —Atlantic salmon.....	660,000	4,856,800	9,443,234	25,700	14,985,734
<i>Salmo irideus</i> —Rainbow trout.....			2,120	64	2,184
<i>Salmo salar</i> sebago—Sebago salmon.....			30,600	19,241	49,841
<i>Salvelinus fontinalis</i> —Speckled trout....	179,000	1,246,000	9,747,196	69,915	11,242,111
	839,000	6,102,800	19,223,150	114,920	26,279,870

## DEPARTMENT OF FISHERIES

HATCHERIES AND REARING STATIONS OPERATED, THEIR LOCATION, DATE ESTABLISHED, THE SPECIES AND THE NUMBER OF EACH SPECIES-DISTRIBUTED FROM EACH ESTABLISHMENT DURING 1943

Estab- lished	Hatchery	Location	Species	Fry	Advanced fry	Fingerlings					Year- lings and other	Total distri- bution by species	Total distri- bution by hatcheries
						No. 1	No. 2	No. 3	No. 4	No. 5			
1929	Antigonish.....	St. Andrews, N.S.	Atlantic salmon.		270,000	675,000	35,000				11,726	950,000	
1876	Bedford.....	Bedford, N.S.	Speckled trout.		345,000	2,895,000	220,497	113,618	3,533			3,580,374	4,550,374
1937	Coquitlam.....	Jackson, N.S.	Atlantic salmon.			215,000	70,749					192,769	
1938	Coldbrook (f).....	Coldbrook, N.S.	Atlantic salmon.			18,000	11,278					296,278	
1936	Grand Lake (f).....	Wellington Station, N.S.	Speckled trout.			149,000	66,500					84,500	
			Atlantic salmon.				88,500	176,691				414,501	498,691
1937	Kejimikujik (f).....	New Grafton, N.S.	Seabago salmon.				141,010	184,905			131	350,669	350,669
			Speckled trout.									184,905	
1912	Lindlof.....	St. Peters, N.S.	Atlantic salmon.				116,200		129,344		29,660	129,344	214,696
			Speckled trout.				90,000	10,500	10,700			137,400	
1902	Margaree.....	N.E. Margaree, N.S.	Atlantic salmon.			444,000	140,000	75,000	230,000			395,000	206,834
1935	Mersey River (f).....	Liverpool, N.S.	Speckled trout.	650,000	445,000	1,065,000	695,000	52,000	3,000	1,959	406	641,355	1,036,365
			Atlantic salmon.			925,200	63,900	104,500			159	2,005,159	
1913	Middleton.....	Middleton, Annapolis Co., N.S.	Speckled trout.						130,000	23,390	3,681	1,250,671	4,155,830
			Atlantic salmon.			255,000		150,000	35,420			192,700	
1933	Nictaux Falls, (f).....	Nictaux Falls, N.S.	Speckled trout.				225,000	150,000				35,420	228,120
1929	Yarmouth.....	South Ohio, N.S.	Atlantic salmon.	10,000			279,000	155,000	44,650			630,000	
1939	Charlo.....	River Charlo, N.B.	Speckled trout.			88,500		25,310	78,950		16	478,650	1,108,650
			Atlantic salmon.			245,000		20,000	1,184		14,425	192,812	10,000
1928	Florenceville.....	Florenceville, N.B.	Speckled trout.	12,000	798,000		674,900					280,609	473,421
			Atlantic salmon.		25,000			38,402				1,472,900	
			Seabago salmon.			1,330,000	10,000	8,500				75,402	1,548,302
			Speckled trout.								25,525	1,394,025	
1880	Grand Falls.....	Grand Falls, N.B.	Atlantic salmon.		552,000	1,111,000		36,000			12,925	12,925	
1874	Miramichi.....	South Esk, N.B.	Speckled trout.	125,000	883,000	126,800	456,943	154,307	20,000	20,000	3,432	1,742,432	3,149,382
1914	Saint John.....	Saint John, N.B.	Atlantic salmon.		2,400,800	657,200	292,200					1,651,140	
			Speckled trout.			118,000	22,500					422,000	2,073,140
			Atlantic salmon.			590,000		70,250			293	3,350,200	
			Rainbow trout.						27,100			140,793	3,490,933
			Seabago salmon.					2,120			64	67,350	
1938	Cardigan (f).....	Cardigan, P.E.I.	Speckled trout.		95,000	535,000	3,790	30,600			6,185	36,785	
1906	Kelly's Pond.....	Southport, P.E.I.	Atlantic salmon.					14,844	19,192		6,322	716,148	1,442,467
			Speckled trout.				1,500	12,000	35,330			47,330	
			Atlantic salmon.			426,000	29,600	191,000	29,719			222,219	299,549
			Speckled trout.			328,500	91,240					515,600	
												488,740	1,004,340
				839,000	6,102,800	12,446,220	3,714,327	1,816,647	1,200,607	45,340	114,920	26,279,870	26,279,870

(f) Rearing station.

The fry and fingerlings included in this distribution were from collections in the autumn of 1942 and the spring of 1943.



## NUTRITIONAL EXPERIMENTS

Nutritional experiments were continued. Rations that were least efficient last year were discarded and several new ones were added. The importance of this nutritional work was further stressed by smaller, and in some instances, by insufficient quantities, along with increased cost, of the meat products largely used in the feeding of hatchery fish being available. In the experiments 17 different ingredients were used in various compositions and 131 tests were made during the year. Some of the rations used gave promising results from the standpoint of mortality, growth and the cost of the ration used to produce a pound of fish. Most of the experimental feeding was with speckled trout.

## LAKES MANAGEMENT

The Charlotte County Lakes management, a co-operative effort between the Fish Cultural Branch and the Atlantic Biological Station of the Fisheries Research Board, was continued. Eight lakes are included in the plan. These are stocked on an area basis and in different years with speckled trout No. 2 fingerlings, No. 5 fingerlings and yearlings, closed, reopened to angling, and a creel census is taken when the planted fish are three years old.

Welch and Gibson, stocked in 1941, and Johnson and Kerr, stocked in 1942, were closed; Limeburner and Bonaparte, which were open, were stocked respectively with No. 2 and No. 5 fingerlings (approximate); St. Patrick and Crecy which had been closed for two years were reopened and a creel census was taken, which gave a yield of 2 pounds of speckled trout per acre for Crecy and approximately 7/10 pounds per acre for St. Patrick Lake. The spawning grounds of those lakes are normal for the district and natural reproduction in them was assisted on an acreage basis with hatchery stock. The yield per acre as shown by the accompanying statement of census returns indicates that those lakes and probably lakes of the same type in other districts are of such low fertility and are such poor producers as scarcely to justify the distribution of hatchery stock in them until their fertility or productive capacity is improved. These census returns also indicate what may be regarded as the average annual crops of trout that may be expected from many lakes in the Maritime Provinces and that their production is not to be improved materially by the distribution of hatchery stock.

		Yield per acre	
Kerr Lake	.....1941	.4 pounds	
	.....1942	.2 "	
Johnson	.....1941	.9 "	
	.....1942	.1 "	(estimated)
Bonaparte	.....1942	1.1 "	
Limeburner	.....1942	.4 "	
	.....1943	.1 "	(approximate)
St. Patrick	.....1943	.7 "	"
Crecy	.....1943	2. "	

It is, however, a well-established fact that the use of various fertilizers increases the productivity of some types of fresh water lakes. Fertilizers of different kinds have been used to a considerable extent in the pond culture of such fish as black bass, but little has been done to determine if the production of speckled trout, a very important game fish, can be improved by the fertilization of lakes in the Maritime Provinces.

The production of trout per acre in all eight lakes included in the plan, in their present natural condition will be known when the returns from the proposed creel census in Welch and Gibson lakes are available next year and the situation will be excellent for the consideration of steps to determine the efficiency or otherwise of fertilizing lakes of this class in relation to the cost of the material and labour involved.



## RAINBOW TROUT

The first recorded distribution of rainbow trout in the Maritime Provinces were made in 1899. Some excellent angling followed the earlier distributions when the fish were in their second and third years which led to numerous applications and petitions for further distributions. As the earlier distributions, with one exception, disappeared after their second or third years, later applications for suitable lakes that were not landlocked were considered only when the applicants undertook to install and maintain screens or barriers to prevent the egress of the planted fish. In the majority of instances the applicants lost interest after a few years or moved to other localities and the screens or barriers were allowed to disintegrate or become ineffective. In a few instances screens have been maintained and satisfactory sport enjoyed.

While rainbow have spawned and excellent angling has been enjoyed in some waters in which there is now no evidence of them, in only one instance, viz., Crooked Creek, Albert County, N.B., the headwaters of which were stocked in 1900, can it be said that a resident population has been maintained by natural reproduction where there are no natural or artificial barriers to prevent its migration. A resident population of rainbow may be present also in Little River, which is open to Saint John Harbour, and on which the Saint John Hatchery is located, as rainbow have spawned there and specimens ranging from a few ounces to two pounds have been seen. It is, however, possible that the presence of various sizes may be due to escapement from the hatchery ponds and troughs.

The source and nature of the water in which rainbow trout are thriving at the present time and the geological nature of the areas are:—

Water	Source	pH	Outlet	Geological formation
Crooked Creek, N.B.....	Springs, fast water, long riffles, deep rock pools.	8.0	Open to sea.	Pre-Cambrian volcanic rocks cut by pre-Carboniferous granitic intrusions.
Pisquid Lake, (O'Keefe's), P.E.I.....	Springs.....	5.8	Underground seepage except during high water. Outlet screened.	Shales and sandstones of Permian age.
Glenfinnan Lake, P.E.I.....	Springs.....	6.0 to 6.4	Underground seepage except during unusually high water.	Shales and sandstones of Permian age.
Sunken (Sumpter) Lake, N.S...	Springs.....	7.1 to 7.5	Screened.	Devonian granite.
Pugg Lake, N.S.....	Springs.....	5.5 to 5.8	Underground	Devonian granite.

The experience of other countries in establishing resident populations of rainbow trout at a distance outside their natural range has more or less paralleled the experience in the Maritime Provinces. This has been attributed by different observers to such factors as an admixture of steelhead blood or an inherited migratory tendency in the parent stock; insufficiency of suitable natural food; uncongeniality of the water; competitor or predator fish or the rapid growth and early maturing characteristic developed by selective breeding in domesticated or hatchery brood stock. Whatever may be the predominating influence in regard to their disappearance, in most cases, in the Maritime Provinces, it does not seem to have been an inherited characteristic or tendency of the stock as a

self-sustaining population has prevailed in Crooked creek, while the fish have disappeared from all other waters in which they were distributed at the same time.

The presence of rainbow trout in a speckled trout area such as the Maritime Provinces is not only a splendid addition to the angling but also provides excellent sport in the late summer and autumn when the rainbow are in prime condition, while the native speckled trout are not at their best or are protected by close season. In view of the above, and the possibility of better results being obtained by doing so, arrangements have been made to distribute rainbow from four different sources in Sherbrooke or Nine Mile Lake, one of the larger lakes of Nova Scotia with inflowing tributaries of considerable volume. Distributions heretofore have been made, with the exception of Bear River, N.S., in the smaller streams and lakes. Rainbow from the following sources are to be used:

1. The resident rainbow trout (spring spawners) of Crooked creek, N.B., which is open to the sea.

The age at which the native rainbow spawn in Crooked creek is not known but the males of this strain retained at the Saint John hatchery spawn at the end of their second year when they are about three-quarters of a pound in weight, and the females at the end of their third year. At the end of the third year the fish average about one and one-half pounds in weight and fifteen inches in length.

2. Rainbow (Kamloops) trout of Paul Lake, B.C.

Paul Lake rainbow or Kamloops trout are spring spawners and their migration is from the lake to spawning grounds in inflowing streams. The growth varies according to the abundance of natural food in relation to the population. The average weight of the mature fish was four pounds in 1922 and two pounds in 1925. Females spawn for the first time at from two to six, the majority at from three to four years of age, and the males at from one to six, the majority at three years.

3. Autumn spawning rainbow from the Bourbon hatchery, Missouri, U.S.A.

The original Bourbon stock came from the McCloud River, California, and has a known history of over sixty years, having been selected and bred for size, egg production, and the development of autumn spawning, in the hatcheries of the United States Fish and Wildlife Service. The spawning season for rainbow in California is in the spring, but by vigorous selection at the hatcheries the autumn spawning characteristic has been developed to a point where the spawning season may correspond with that of native speckled trout. The eggs of this stock have sometimes been taken as early as September. The fish at Bourbon mature and spawn in approximately twenty months when the females average one pound and the males twelve ounces in weight. At three years of age they average, respectively, 3 pounds 12 ounces, and 2 pounds 8 ounces.

4. Rainbow trout, spring spawners, from a commercial fish farm in Massachusetts, U.S.A.

This stock has been developed from selected fish for fast growth and large egg production for the past eighteen years without introducing any new blood. The original stock was obtained from several eastern sources all highly domesticated. Their growth during the first year is quite moderate but at two and two and one-half years the fish take on weight quite rapidly. From that time onward growth is seemingly dependent upon the individual fish. Frequently four year old trout

weigh as much as four pounds and sometimes larger. At the same time, fish of the same age will weigh about one and one-half pounds and others, seven and eight years old, may not exceed two or three pounds. One  $5\frac{1}{2}$  year old fish weighed  $8\frac{1}{4}$  pounds and produced 7,000 eggs. The eggs to be used in this experiment are from four year and older parents.

The eggs from the four sources will be hatched and the resultant fry and fingerlings will be reared under similar conditions. Three of the lots of fingerlings will be marked in different ways by the removal of the adipose and one of the side fins. The fourth lot, the Paul Lake fish, will not be marked as these eggs will not hatch until July and the fingerlings will be small and difficult to mark when all lots will be distributed. When the fish are in their third year efforts will be made by test fishing or creel census to determine the percentage survival from each strain.

The co-operation of the United States Fish and Wildlife Service and the Game Board of British Columbia in supplying the Bourbon hatchery and the Paul Lake eggs is gratefully acknowledged.

#### THE SALMON OF SHUBENACADIE, GRAND LAKE, N.S.

The fresh water salmon of the Shubenacadie Grand Lake watershed are usually referred to locally as "grayling," less frequently as salmon or sebago. They are the only resident population of fresh water salmon of any importance in the province and are of considerable local interest as an angling attraction.

Since the Grand Lake rearing ponds were transferred to this department by the provincial government in 1936 their first interest has been the lake or sebago salmon of the watershed, although large numbers of Atlantic or sea salmon, and latterly some speckled trout, have been reared to the fingerling and older stages. Lake or sebago salmon eggs have been collected each autumn, the adult fish being trapped in the fishway in the Fletcher Run at the ponds and in Rawdon River, both at the head of Grand Lake. To gain information in regard to their movements and the extent to which they might contribute to the angling most of the sebago salmon distributed from the ponds have been marked by the removal of the adipose and the right ventral fins and distributed in Grand Lake. The first distribution of marked fish was made in 1936. Each year since then all fish taken in the traps have been carefully examined for missing fins and the co-operation of anglers and guides solicited in reporting the taking of marked fish. Nothing has been paid for such returns.

The catch of the rearing pond traps in any year has been small in number, ranging from a low of nineteen fish in 1942 to a high of 122 in 1941. Although larger fish are taken, the average weight of those retained for stripping ranged from an average low of  $1\frac{3}{4}$  pounds in 1936 to an average high of 3 pounds in 1938. The collection of eggs averaged 35,000 annually from 1936 to 1943, inclusive. In addition to those obtained at the traps, some eggs of poor quality have been taken each year from pond reared sebago salmon. While the returns are purely voluntary on the part of anglers and guides, they reported 22 marked fish from Grand Lake in 1938, two years after the first distribution. Many more are believed to have been caught. Marked fish have since been reported in considerable numbers not only from Grand Lake, where they were distributed, but from other lakes in the watershed. Marked fish have also comprised a considerable percentage of those taken each year in the rearing pond traps.

In 1940, 39.5 per cent of those taken in the traps including sixty small immature fish that were released, as well as 32 per cent of those reported by anglers from William or First Lake, bore the pond mark. Mr. Leonard Oickle, a guide of Porto Bello, reported 62 marked fish in 1940, 102 out of 274 taken



by his boats in Lake William in 1942 and 53 in 1943. Mr. Leslie Cook who has a camp at Grand Lake reported 50 marked fish out of 85 taken by him and friends during 1942. Small immature marked fish in various numbers are taken annually at the traps.

To reach Lake William from Grand Lake where they were distributed, the fish ascended the fishway at the head of Grand Lake and passed through Lake Fletcher, Lake Thomas and intervening streams. The increase in altitude between those lakes is only 17 feet. Two marked fish were reported from Springfield Lake in 1942 and one from the Shubenacadie River in 1942. The Shubenacadie fish is the only one reported from the river below Grand Lake. To reach Springfield Lake from Grand Lake the fish passed through Kinsac (Long) Lake, Beaverbank Lake, Hamilton, Square, Fenerty and Lisle Lakes and intervening streams, and to an altitude nearly 300 feet higher than where they were distributed.

39.5, 62.3, 89.5 and 66.1 per cent of those that were taken in the traps were marked fish in 1940, 1941, 1942 and 1943, respectively.

As returns were purely voluntary, there is little doubt but that many, probably a large percentage of the marked fish were not reported. The returns, however, indicate a movement of the sebago throughout the watershed and the importance of the rearing ponds in maintaining the angling for this species in these waters.

The sebago salmon distributed from the Saint John Hatchery in the Chamcook Lakes, N.B., are also marked by the removal of the adipose and one of the side fins. Thirty-four per cent of those taken in Chamcook Lake during the collection of sebago salmon eggs in 1942, 57 per cent of those taken in the same lake, and 34 per cent of those taken in Gibson Lake in 1943 were hatchery marked fish. Undoubtedly many were taken by anglers during these years that were not reported.

In addition to the sebago salmon, considerable numbers of Atlantic salmon and speckled trout fingerlings and older fish distributed from the Maritime Province hatcheries were marked by the removal of the adipose and one of the side fins. Anglers' returns were supplemented by reliable estimates of recaptures furnished by departmental officers. As might be expected, percentage survival or catch returns varied greatly being influenced by the productive capacity of the different lakes, the age or size of the planted fish, the interest and co-operation of the anglers and local residents, and the ability of local officers to enlist that interest and co-operation. Apart from other circumstances, the returns indicate that, as a general rule, a voluntary census does not give a complete or reliable picture of the catch.

The numbers of marked trout reported from waters stocked from the Antigonish hatchery were in excess of the total numbers reported from all other districts, although general publicity was similar in the way of notices posted at the different lakes, and the distribution and the placing of report cards at convenient points at or near the various lakes. The returns are not sufficient to give a picture of the relative value of autumn and spring stocking, but in some instances they indicate worth while contributions to the anglers' catch and a rather widespread distribution from where the fish were planted. The best returns were:



Hatchery Area	Lakes Stocked	Percentage recaptures reported of numbers of marked fish distributed 1935—spring 1943
Antigonish.....	McDonald Dam, East River.....	15
	Simon Lake, " ".....	31
	Coosee Coffre Lake, Cole Harbour River.....	17
	Copper Lake, South River Lake.....	37
	Grant Lake, " ".....	18
	Pinevale Lake, " ".....	30
	Cutler Lake, Salmon River.....	21
	Donahue Lake, Larry River.....	18
	Stewart dam, Little Harbour.....	16
	James River Lake or McLean Lake, West River.....	19
	Jellow Lake.....	20
	Sherbrook Lake and tributaries.....	21
	Trout Lake—East River St. Mary.....	32
	Mountain Meadow pond, West River.....	27
	Three Mile Lake.....	26
Lindloff.....	McIsaac Lake (Richmond County).....	15
	Shaw Lake (Madame Island).....	21
Middleton.....	Sand Lake (North Mountain).....	14
Saint John.....	Mechanic Lake, Pollett River.....	29

Recaptures reported from all lakes in the Antigonish hatchery area amounted to 14·5 per cent of the number of marked trout that were distributed.

While most of the marked trout were reported from the lakes in which they were distributed or from their tributary streams, in some instances they had travelled considerable distances from where they were liberated. Several trout, hatchery bred for several generations, distributed in West River, were caught in Antigonish Harbour and one liberated in Cutler Lake was caught in Cutler's Cove. Fingerlings distributed in Kejimikujik Lake crossed that lake, descended the Mersey River and were caught in its tributaries. Trout from the Yarmouth hatchery distributed in Lake Skinner in the autumn descended the outlet into Carleton River, moved upstream the year following, and were caught from ten to twelve miles from where they were planted. While the number is small, reports of this nature indicate that, under certain conditions, hatchery reared trout may roam to such an extent that they may contribute little to the angling of the waters in which they are distributed.

### *Regeneration of Clipped Fins*

While complete removal, particularly of the side fins, is essential to the permanency of this method of marking, a great deal of its efficiency in this Department's experience depends upon the size of the fish. This has been the experience at the various hatcheries, as it was in the experiment referred to in Supervisor Tingley's accompanying report.

The Canadian National Railways, the Canadian Pacific Railway and the Dominion Atlantic Railway companies continued their generous assistance and co-operation by furnishing free transportation, as indicated in the following summary, for shipments of game fish and game fish eggs with their attendants.

Railway	Total mileage on trip passes	Number of passages	Mileage baggage car permits			Number of cases of cans			Number of permits
			Full	Empty	Total	Full	Empty	Total	
C.N.R.....	3,881	22	4,523	3,353	7,876	61	57	118	36
C.P.R.....	1,253	6	945	945	1,890	12	12	24	10
D.A.R.....	434	2	320	320	640	6	6	12	4
	5,568	30	5,788	4,618	10,406	79	75	154	50

NOTE.—Number of passages refers to transportation one way—a return trip counting as two passages. Number of permits refers to one way passages for cases or cans.

Selective breeding of speckled trout was continued to develop such characteristics as increased vitality, high yield, rapid growth, early spawning, colouration and general appearance. Outstanding pairs at each hatchery are mated and their progeny segregated. The progeny of the pairs in which survival is highest is retained for brood stock and subjected to periodical selection so long as they are profitable egg producers. If space permits the segregation and further selection will be carried to the fingerling stage. The eggs of some of the pairs in which survival is highest at the eyed stage are exchanged by the several hatcheries. The average yield of the selected pairs and of the general groups were as follows:—

Hatchery	Age in Years	Average yield per female 1943	
		Selected Group	General Group
Antigonish.....	3	4,440	2,783
	2	3,177	2,079
Lindloff.....	3	3,438	2,525
Margaree.....	3	2,629	1,757
Charlo.....	2	1,177	676
Florenceville.....	2	1,000	537
Saint John.....	3	3,643	2,486
".....	2	2,644	1,879

The range of small mouthed black bass in the Maritime Provinces was further extended by the transfer of adults from Lake Utopia, Charlotte County to Miller's pond, Grand Manan Island, N.B.

A drip incubator was tested with satisfactory results at the Middleton hatchery.

Operations generally at each establishment are referred to in the accompanying reports of Supervisors and Superintendents.

Owing to conditions brought about by the war, and a limited appropriation, new construction was not undertaken and repairs and replacements were confined to essentials.

Collections, transfers and distributions are given to the nearest hundred in the summaries of operations at the respective establishments.

## MARITIME PROVINCES

*Senior District Supervisor of Fish Culture, James Catt*

With some exceptions reaction to the drought and high temperatures of 1942 was apparent in the indifferent quality of speckled trout ova hatched early this year (1943) and in resultant fry and early fingerlings. Notwithstanding this, very favourable weather throughout the greater part of the summer and fall permitted the rearing of very fine late fingerlings. Some heavy

losses occurred also in young salmon largely before the free swimming stage was reached.

Parent stocks of speckled trout were maintained in excellent condition until the fall when heavy losses occurred at some plants. Later the quality of ova obtained at these establishments was poor. Up to the present the cause of these losses has not been determined.

Transfers of wild fish as stocking media were limited to small mouthed black bass. On May 29 thirty-eight of these, captured by angling at the mouth of Trout brook, Lake Utopia, New Brunswick, were transferred in 8½ hours by truck, patrol boat, team and hand to Miller's pond, Grand Manan. Temperature at loading point was 52° F. and at point of release 62° F. In spite of unforeseen transportation difficulties and delays no loss occurred in transit. The collection effort included the capture of a number of bass so large that their length exceeded the diameter (18") of the distributing can. These fish were released at the point of capture. The average weight of those transferred was 1½ pounds with a maximum of 3 pounds.

On May 30 and 31 about one quart of smelt eggs and debris to which they adhered were collected from the main affluent to Mill Lake, Charlotte County, and laid down in the spring feeder to Wheaton Lake. The Mill Lake smelt spawn at night in the very rapid water of the lake's main affluent, and commence their spawning run May 21 or 22 descending to the lake each dawn. The spawning period is very short, usually less than a week. Careful observation on May 30 and 31 failed to disclose the presence of a single smelt in the spawning brook.

In order to add new blood to the non-migratory rainbow trout brood stock at Saint John hatchery, a collection of wild fish from Crooked creek, Albert County, was made by angling as the physical characteristics of the stream render the use of nets and traps inefficient. As bait fishing usually results in considerable damage to the fish hooked, wet and dry flies only were used. The fish were retained in large covered floating trays during the collection period. Angling conditions were bad on August 30 and 31 but improved on September 2 when sixteen fish were taken in three hours. In the four days August 30 to September 2 forty-four rainbow were taken. Of these one died in the retainer, five escaped, three died in transit and thirty-five were delivered to the Saint John hatchery. Subsequently twenty-seven died leaving only eight. The cause for the loss was not ascertained. It is comparable to that which occurred following a similar collection made some twelve years ago when out of 35 fish transferred from the stream to the hatchery, 27 died. The survivors were sufficient for the development of a large brook stock for a number of years. The pH and temperature conditions at Crooked creek and the hatchery were about the same when the transfer was made but the Crooked creek water may be highly mineralized. A sudden change from this might constitute a very adverse factor. Both rainbow trout and speckled trout populate the river. The former were observed in large numbers; captures varied from 3 ounces to 1½ pounds.

On the strength of what I considered to be reliable information I reported in 1941 that West River at that time must undoubtedly contain a few rainbow trout; that these must have descended Crooked creek to Shepody River and thence ascended West River and that no rainbow had been seen in North River. West and North Rivers flow into Shepody River, an estuary common also to Crooked creek. In 1941 and 1942 West and North Rivers received rainbow trout fingerlings and yearlings, Crooked creek stock, from the Saint John hatchery. At the end of July and the beginning of August, 20 trout were captured in North River on reaches extending from the point of liberation upstream for approximately one mile. Of these 11 were speckled trout and 9 rainbows from 2 inches in length to ¼ pound in weight. In West River, distributions had been made at the extreme headwaters and about three miles above



its junction with North River (tidal water). No rainbow trout were observed at the headwaters although a number of speckled trout fingerlings were seen. The stream at this point is very small and it is probable that the rainbow trout moved downstream as they grew larger. The mid section of the river produced a large number of small speckled trout. On the lower reaches two rainbow trout of about  $\frac{1}{2}$  and  $\frac{3}{4}$  pounds were observed and one 5-inch specimen was taken. Two others of 7 or 8 inches are reliably reported to have been taken earlier in the year.

Whilst both West and North Rivers are heavily stocked with speckled trout of very small size a similar condition formerly obtained in Crooked creek. Rainbow trout in the latter grow to a relatively large size and it is this stock that has now been introduced into the former.

Trout Lake, Charlotte County, N.B., and its main tributary Spear's brook were selected in 1942 to test the relative efficiency of distributing hatchery produced trout in lakes or in their tributaries. In the autumn of that year 14,384 and 14,293 speckled trout No. 4 fingerlings were liberated in the respective waters. In June of this year (1943) three of the marked fish recaptured had been distributed in the lake and one in the brook. In September another fish of lake distribution was taken. The June fish averaged 6 $\frac{3}{4}$  inches in length. The September fish, a gravid female, weighed about 8 ounces. Many yearling trout were observed in the lake and although the number caught was small, about 40 per cent was marked.

Although in some districts there was a marked increase in the number of reports on recaptures of marked fish the angling public continues to be lamentably lax in making returns. Of the landlocked salmon taken in traps operated by the department's officers in making ova collections at Chamcook and Gibson Lakes 57 per cent at the former and 34 per cent at the latter site were marked hatchery products.

A new departure in selective breeding at Lindloff produced unusual results. The last of the wild female speckled trout from McRae Lake—an early spawning strain—was crossed with quick growing hatchery stock in 1942. During July the resultant fingerlings reached a size about three times as big as those from either of the strains from which the cross was produced. From a similar cross effected this fall allotments of 5,000 eyed ova were sent to each of the following hatcheries: Antigonish, Cobequid, Saint John, Florenceville and Margaree.

Nutritional tests were continued with varying results. Unfortunately some of the planned diets had to be modified as certain ingredients were not available.

In addition to approximately 25,862,500 speckled trout eggs produced from hatchery stock 417,900 were obtained from wild fish. From 4,857 Atlantic salmon impounded there was a yield of 22,097,100 ova. Of 155,600 landlocked salmon eggs laid down, 81,400 were from pond stock. Hatchery reared rainbow trout yielded 22,800 ova. Approximate distributions totalled:—

	Fry and Fingerlings	Yearlings and older fish
Speckled trout.....	11,172,200	69,915
Atlantic salmon.....	14,960,000	25,700
Landlocked salmon.....	30,600	19,241
Rainbow trout.....	2,100	64

In co-operation with the Fisheries Research Board assistance was given Doctors A. W. H. Needler, A. G. Huntsman and P. F. Elson in the selection of sites on which to build dams to create trout ponds in Prince Edward Island and in the distribution of Atlantic salmon fingerlings in the Petitcodiac watershed.

Extreme freshet conditions rendered somewhat abortive the collection of ova from wild trout in the Lake Utopia area and of landlocked salmon in the Chamcook Lake and region. In the case of the Lake Utopia area it was impractical to install a satisfactory fence and trap. This was particularly



disappointing as trout taken there on their spawning run should include those marked for the efficiency test of lake versus stream distributions. At Chamcook the young sebagos captured represent a much higher percentage of the total catch than usual. The percentage of males was also unusually large. The collection area was expanded to include Gibson Lake where the capture of many marked sebagos showed the wide dispersal of these fish from the nearest point of distribution, the brook joining upper and lower Chamcook Lakes.

Requests submitted to the Department by local Fish and Game Protective Associations for the introduction of black bass into coarse fish waters were met by instructions to the staff to make the necessary surveys. These proved satisfactory and provision has been made to stock the waters in 1944.

There was no major new construction in the division during the year but improvements and repairs were effected where necessary.

Fish cultural problems were discussed at meetings of the Fish and Game Protective Associations in each of the Maritime Provinces. Their co-operation in supplying information is appreciated.

Assistance was kindly given by the staff of the Department of Lands and Mines, New Brunswick, in commencing a survey of the East Musquash watershed.

The co-operation of the Administrative staff and of the staffs of the Fisheries Research Board stations at St. Andrews and Halifax was most helpful.

*District Supervisor of Fish Culture, F. A. Tingley*

Biological material collected from the lakes and streams during last summer was studied early in the year. Visits were made to the Saint John hatchery and some assistance given in the investigation of illegal fishing in three lakes. Salmon fishermen and dealers were canvassed to stimulate interest in detecting and reporting marked salmon. Assistance was given in transferring small-mouthed black bass from Lake Utopia in Charlotte County to Miller's pond on Grand Manan Island; in the collection of smelt eggs at Mill Lake and their transfer to Wheaton's Lake; in collection of wild rainbow trout at Crooked creek for the Saint John hatchery; in the collection of sebago salmon eggs at Chamcook and Gibson Lakes, and the collection of speckled trout eggs at Trout and Spear's brooks in the Lake Utopia area.

An attempt was made to collect gaspereau fingerlings in Denny's brook, Charlotte county, to establish a run of that species for bait in Grand Manan Island. Fingerlings in sufficient numbers were not found and from the frailty of the few captured it seems doubtful whether they can be transferred successfully.

An experiment was conducted at Saint John hatchery in clipping fins of three sizes of speckled trout fingerlings, viz. 2-2½", 3-3½" and 4-4½", to obtain further knowledge concerning regeneration of fins. The group of smallest fingerlings was marked by removal of the adipose and left ventral fins on August 13, the second or intermediate group by removal of the adipose and right ventral fins on September 8, and the third or largest group on the same date by removal of the adipose and left pectoral fins. All fingerlings were retained in one of the smaller ponds. On May 4, 1944, they were examined for regeneration of the clipped fins. In the smallest group out of 79 fingerlings, 29 showed no regeneration, the balance indicated regeneration of from 10 to 95 per cent. In the intermediate group out of 92 fingerlings, 64 showed no regeneration and the balance from 10 to 30 per cent. In the largest group out of 93 fingerlings, 80 showed no regeneration and the balance from 10 to 30 per cent. The regeneration in every case occurred in the ventral and pectoral fins. It would be readily detected up to 70 per cent by a casual observer but the 95 per cent regeneration was discernable only on close examination.

All the Prince Edward Island and New Brunswick hatcheries, except Saint John, were inspected as were the Nova Scotia plants at Grand Lake, Bedford, Middleton, Yarmouth, Cobequid, Coldbrook, Kejimikujik and Mersey. On one of the inspection trips arrangements were made with Messrs. Gorton-Pew Limited, Caraquet, for a supply of frozen cod livers as a supplementary hatchery fish food. The following waters were examined or visited in New Brunswick. Trout, Quinn, Shaw and Kelly Lakes, Burpee and Lenihan's brooks and Petiteodiac waters; and in Nova Scotia, Hart, Long and Layton Lakes, Nappan River, Amherst Town Reservoir, MacLellan's brook, Trueman's pond, Paradise flowage and Shinimikas waters.

*District Supervisor of Fish Culture, A. P. Hills*

Material collected while on field duty in 1942 was examined and identified. Some patrol work was carried out on three lakes in the county of Saint John, fishing gear pick up and turned over to the local fishery officer. The annual meeting of the New Brunswick Guides' Association in Fredericton was attended April 7 and 8.

Grand Manan was visited on May 5 in connection with the proposed transfer of parent gaspereau, and a run of fish to Denny's stream located. Survival tests were later carried out, but with such unsatisfactory results that the idea of transferring adult gaspereau was abandoned.

Waters examined and reported on during the year included Howe, Calvin and Otter Lakes in New Brunswick and Hennigar's, Miemac and Banook Lakes in Nova Scotia. Assistance was also given in the examination of Graham Lake, North, West, Salmon and Wolf Rivers, and with a preliminary survey of Loch Alva, all in New Brunswick.

From July 2 to 28 inspections were carried out of the following establishments—Yarmouth, Mersey, Kejimikujik, Middleton, Nictaux, Coldbrook, Bedford, Grand Lake, Antigonish, Lindloff, Margaree and Cobequid. The Director of Fish Culture was accompanied on his inspection of Grand Falls, Florenceville, Yarmouth, Mersey, Kejimikujik, Middleton, Coldbrook, Grand Lake, Bedford, Lindloff, Margaree, Margaree Harbour, Antigonish, Cobequid and River Philip establishments.

During the months of August and September some assistance was given Doctors Huntsman and Elson of the Fisheries Research Board in the plantings of Atlantic salmon fingerlings in the Pollett River and tributaries and the North River, all tributary to the Petiteodiac. Assistance was given in the installation of traps and in egg collecting operations at Trout Lake, Utopia, and at Chamcook Lakes.

Partial supervision and observation of egg collections and shipments at River Philip was carried out, and to a lesser extent, observation of stripping and laying down speckled trout eggs at Antigonish hatchery.

From the latter part of November to the middle of December inspections were made at Kelly's pond, Lindloff, Margaree, Antigonish and Cobequid hatcheries.

ANTIGONISH HATCHERY

*W. D. Turnbull, Superintendent*

A collection of 12,045,400 speckled trout eggs was made from the fish in the hatchery ponds and this was supplemented by receipt of 1,002,300 Atlantic salmon eggs from Cobequid in April and 5,000 speckled trout eggs from Lindloff in November. Outgoing shipments of speckled trout eggs from February to April were: to Bedford 1,200,000, Yarmouth 1,000,000, Grand Falls 1,350,000, Florenceville 350,000, Kelly's 1,500,000, Miramichi 200,000, Charlo 150,000, Lindloff 1,000,000, Margaree 300,000, Middleton 1,200,000 and Cobequid

1,500,000; and in November: to Bedford 1,000,000, Middleton 1,500,000 and Yarmouth 990,000. In October 46,000 speckled trout fingerlings were transferred to Grand Lake rearing station. Distributions for the year were: 980,000 Atlantic salmon and 3,589,400 speckled trout of which 11,726 trout 1, 2 and 3 years old were marked by removal of the adipose and right pectoral fins.

For selective breeding 33 pairs of chosen 3 year old and 13 pairs of chosen 2 year old speckled trout were mated to produce eggs with a view to improving future breeding stock. The eggs from each fish and of each group were segregated and losses recorded up to the advanced eyed stage when further selection of the best eggs will be made. The average yield for the selected three year group was 4,440 per female with the best individual producing 6,480 eggs. For the two year group the average was 3,177 and best individual 3,681. The general group yields for the same ages were; three year 2,783 and two year 2,079. The average yield of the three year general group has shown a progressive increase in the last four years as follows, year 1940 1,971, 1941 2,332, 1942 2,718 and 1943 2,783.

The perimeters of two circular ponds were built up and sodded and the South River storage dam repaired following damage caused by a freshet underscoursing one side.

#### BEDFORD HATCHERY AND SACKVILLE RIVER SALMON-RETAINING POND

*George Heatley, Superintendent*

On February 24 one million two hundred thousand speckled trout eggs were received from Antigonish hatchery, in April 35,000 Atlantic salmon eggs from Dalhousie University and in November the following eggs: 520,700 Atlantic salmon from Sackville pond, 1,557,300 same species from River Philip camp and 1,000,000 speckled trout from Antigonish. Outgoing shipments of young fish in May and June consisted of 50,000 speckled trout to Coldbrook and 331,200 Atlantic salmon to Grand Lake rearing station. Distributions direct from Bedford were: 162,800 Atlantic salmon and 226,300 speckled trout.

Eggs from three pairs of Atlantic salmon from River Philip were held and delivered as required to Doctor Hayes of Dalhousie University, Halifax. The Bedford hatchery staff assisted in making distributions from Grand Lake and Coldbrook ponds. The dam on Sackville River was repaired, fishway and crib-work rebuilt, buildings painted and repaired and three hatchery troughs and part of a supply trough renewed.

At the Sackville River pond between September 16 and October 30 one hundred and seventy-one Atlantic salmon averaging 7 pounds in weight were taken, from which 70 females were stripped, November 2 to 16, yielding 520,700 eggs for Bedford hatchery. Thirty salmon were marked by affixing numbered tags to their dorsal fins—15 celluloid and 15 metal. A considerable number of salmon migrated up river due to unusually high water during the late summer and before the repairs to the Sackville dam had been completed.

#### COBEQUID HATCHERY AND RIVER PHILIP SALMON-RETAINING POND

*P. B. Stratton, Superintendent*

On April first 1,500,000 speckled trout eggs were received from Antigonish, in November 5,000 of the same species, McRae Lake cross, from Lindloff hatchery, and 3,361,100 Atlantic salmon from River Philip pond. Outgoing shipments of Atlantic salmon eggs in March and April were—to Grand Falls 501,150, Antigonish 1,002,300, Nictaux 449,600 and Yarmouth 298,500. Distributions for the year amounted to 84,500 Atlantic salmon and 414,200 speckled trout.



A lift gate was constructed in the dam and repairs and alterations thereat completed. The exteriors of the hatchery buildings were painted and repairs and improvements made to some of the other buildings and grounds. Assistance was given the Fisheries Research Board in their planting program for the Petitcodiac River area.

Messrs. H. R. Cumming, C. Sayer and I. A. Mowat assisted at the River Philip pond. Repairs to the dam were carried out by Foreman C. Stevens to have all in readiness to receive the first fish on October 7. From then until October 29 there was a catch of 1,683 salmon averaging 16 pounds each. From 814 females stripped, November 3 to 26, 6,725,000 eggs were secured and laid down as follows: For Cobequid 3,361,100, Bedford 1,557,300, Doctor F. R. Hayes, Dalhousie University via Bedford hatchery 32,000, Middleton 1,022,100 and Yarmouth hatchery 752,500. Twelve males and 18 females were marked with numbered tags—15 metal and 15 celluloid. This season's run of salmon was probably the largest in some years and it is estimated that 1,000 salmon passed through the fishway after the trap was removed on October 30. This was in addition to what was allowed to ascend before the dam was closed off at the beginning of the run.

#### COLDBROOK REARING PONDS

*E. Barrett, Superintendent*

The ponds were regravelled, disinfected and made ready for operations and between May 29 and June 3 received 350,000 speckled trout fingerlings from Middleton and 50,000 same species from Bedford hatchery. They produced 350,700 late summer and autumn fingerlings which were distributed with the aid of the Middleton and Bedford trucks and staffs. Valuable assistance during the distribution was also rendered by the local Fish and Game Association. The cold storage refrigeration system was operated successfully for the season, keeping the fish food in excellent condition for use at the Middleton hatchery and Stevens ponds as well as at the Coldbrook ponds. The bungalow was painted, ponds relined and minor repairs made to the cribwork at the dam. Trout fishing is reported to have improved considerably this season.

#### GRAND LAKE REARING PONDS

*W. H. Cameron, Superintendent*

Bedford hatchery in June supplied 331,200 Atlantic salmon and Antigonish in October 46,000 speckled trout fingerlings. Operations at Waverley run and Rawdon River in October and November resulted in a catch of 65 sebago salmon (averaging  $2\frac{1}{2}$  pounds in weight), 37 of which were females yielding 53,300 eggs. Of the 65 caught 43 bore the Grand Lake pond mark i.e., 66.1 per cent, which indicates the good work this establishment is doing in keeping up the stock of sebago salmon in local waters. At the hatchery ponds 89 sebago females in November produced 81,400 eggs and 52 female speckled trout yearlings yielded 20,500 eggs, all of which were laid down for incubation in the head trough at the Grand Lake ponds. Distributions for the year were—131 sebago salmon, 184,900 Atlantic salmon and 29,700 speckled trout. The 131 seabagos ranged in age from 3 to 7 years and were all marked before liberation by removal of the adipose and right ventral fins. A hatch was again obtained from eggs of sebago salmon pond stock. The fry and fingerlings, as in the previous year were stronger and grew much faster than fingerlings obtained from wild stock.

A take-down shelter was built over the incubating trough for winter protection, ponds were repaired, some interior painting done and the grounds improved generally.



## KEJIMKUJIK REARING PONDS

*T. K. Lydon, Superintendent*

In May 200,000 speckled trout and the same number of Atlantic salmon were supplied by Middleton hatchery. From these 129,300 salmon and 137,500 trout were distributed before the ponds closed in late October. Ten thousand seven hundred and ninety of the trout released were marked by removal of the adipose and left pectoral fins. Four troughs of trout were given weekly chemical treatments in an effort to secure an effective remedy or preventative for white-spot disease. The rate of water flowage in the troughs was also experimented with and considerable success achieved in improving the condition of the fingerlings by subjecting them to a rapid shallow flow. Two large troughs were built, some painting done and improvements made to the grounds and premises. Trout fishing in Kejimikujik waters is reported as improving every season.

## LINDLOFF HATCHERY

*Wm. T. Owens, Superintendent*

The collection of speckled trout eggs from the hatchery ponds this year was 1,123,100. In order to improve the brood stock 636 McRae Lake females were fertilized with three year old pond stock and produced 126,300 eggs. Six hundred and fifty-six McRae Lake females were also fertilized by McRae Lake males yielding 151,300 eggs. The total collection from this lake viz. 277,600 was the largest yet made at that point. One thousand four hundred and thirty-six of the fish were retained in the ponds. That there are considerable differences in the dates of hatch and later growth is evident from eggs taken in the fall of 1942. Then eggs were secured from McRae Lake females fertilized by McRae Lake males, late McRae Lake females used with early hatchery males and hatchery females used with hatchery males. The first hatches from the respective groups were during the weeks ended November 22, January 16 and February 27. By July the earliest McRae Lake fingerlings and latest hatchery fingerlings were of about the same size, approximately 72 per fluid ounce, while the others, the cross-breeds averaged 25 per ounce. From the McRae Lake cross this year 5,000 speckled trout eggs were shipped in November to each of the following hatcheries—Antigonish, Cobequid, Saint John, Florenceville and Margaree. From Antigonish in March 1,000,000 speckled trout and from Margaree salmon pond in November 1,117,300 Atlantic salmon eggs were received. Distributions for the season were—395,000 Atlantic salmon and 641,400 speckled trout of which 217 of the latter, two years old, were marked by removal of the adipose and left pectoral fins.

In selective breeding 12 pairs of selected 3 year old speckled trout were mated and the eggs segregated. These will be further selected as they develop. The selected fish yielded 3,438 eggs per female as against 2,525 per female for the general group. A freshet on November 12 washed out part of the hatchery supply dam and flooded 2 of the circular ponds releasing a number of fingerlings held therein. A new hydraulic ram was installed to pump water from the flume for domestic purposes. The floor of the garage was raised four inches. New doors were fitted on this building. The exterior of the hatchery was painted, icehouse and garage partly painted and some varnishing and painting done in the dwelling. Perennial plants and shrubs were planted and grounds improved generally.

Fishing in Kilkenny Lake was reported as exceptionally good with approximately 90 per cent of the trout taken bearing the hatchery mark. Fishing in several other waters was also reported good. The fishery officers when requested co-operated as much as possible in making distributions.

## DEPARTMENT OF FISHERIES

## MARGAREE HATCHERY

*J. W. Heatley, Superintendent*

In March 300,000 speckled trout eggs were received from Antigonish and in the autumn 2,965,600 of the same species were collected from the hatchery ponds. Five thousand were also received from Lindloff and 2,719,600 Atlantic salmon eggs from Margaree pond. Distributions for the year were 2,905,200 Atlantic salmon and 1,250,700 speckled trout of which 159 of the former and 1,475 of the latter were marked by removal of the adipose and right pectoral fins.

In selective breeding, eggs from 42 pairs of 3 year old trout were taken and averaged 2,629 eggs per female as against 1,757 per female in the three year general group.

A heavy freshet occurred in November which flooded the ponds on the east side of the road causing some escapement of brood stock. Twenty troughs in the hatchery were replaced by new ones. A new water tight dam was placed at the head of series A ponds. The hatchery and barn were stained and some varnishing done in the dwelling. The hatchery truck was replaced and the grounds improved. Trout fishing in the Margaree and Lake O'Law districts continued good and that in the Margaree River was the best in years. The district fishery officers co-operated in every way possible.

## MARGAREE SALMON-RETAINING POND

*J. P. Chiasson, Superintendent*

In accordance with the usual practice, the salmon for this pond were purchased from the Margaree Harbour Salmon Fisheries Association. Preparations for pond work began September 20 and consisted of cleaning the pond, repairing gates, caulking and painting the boat and repairing the wire fence around the pond. The net was fished continuously from September 28 to November 12 on which date it was taken out by a heavy freshet in the river. It captured 470 salmon. Four hundred and fifty-five of these averaging 10.7 pounds in weight were retained. Fifteen were liberated above the net. Only 4 fish were lost during the retention period. From 298 females, from November 15 to December first 3,836,900 eggs were secured and allotted 2,719,600 to Margaree and 1,117,300 to Lindloff hatchery. Nineteen males and 11 females were marked—15 with celluloid tags and 15 with metal. During operations 4 salmon were captured with adipose fins missing.

## MERSEY RIVER REARING PONDS

*C. E. Harding, Officer-in-Charge*

Between May 21 and June second 250,000 Atlantic salmon and 50,000 speckled trout fingerlings were received from Yarmouth hatchery. They made good growth throughout the season, some measuring over six inches when distributed the second week of October. The output was 192,700 salmon and 35,400 trout.

Assistant W. S. Freeman was in charge from September 1 as Assistant Harding was required to take charge temporarily at Yarmouth. During the season the camp was painted, new roofing installed and a porch constructed. The foot bridge across the canal was painted, approaches graded and grounds improved. Assistance and co-operation were rendered by the staffs of the Nova Scotia Power Commission, the Mersey Paper Company, the Fishery Inspector and members of the Queen's County Fish and Game Association.

## MIDDLETON HATCHERY, STEVENS PONDS AND NICTAUX REARING STATION

*F. M. Millett, Superintendent*

Eggs received in March were 1,200,000 speckled trout from Antigonish and in November 1,500,000 speckled trout from the same hatchery and 1,022,100 Atlantic salmon from River Philip pond. In May and June outgoing shipments of speckled trout were 350,000 to Coldbrook and 200,000 to Kejimikujik and in April and May Atlantic salmon 200,000 to Kejimikujik and 400,000 to Nictaux. Distributions consisted of 630,000 Atlantic salmon and 478,650 speckled trout, 5,100 of the former being marked by removal of the adipose and left ventral fins.

Four new cement dams or barriers were constructed at Steven's ponds to replace wooden ones. A compact unit for holding eggs in case of water shortages known as a drip incubator was tried out from January 4 until March 14, three days before the eggs hatched. It was  $17\frac{7}{8}$ " x  $11\frac{3}{4}$ " and  $39\frac{1}{2}$ " high and held 35 trays of eggs. Water entered at the top and dripped continuously through each tray keeping all eggs moist. The trays carried 86,100 Atlantic salmon eggs and showed a loss of 7,700 or 8.9 per cent. The loss in the general group held in troughs for the same period was 14.8 per cent. The eggs in the incubator were three days later in beginning to hatch than those held in troughs but both completed hatching at the same time. The incubator eggs were picked weekly and clean moss and cheesecloth placed on them three times during the period of operations. At no time was it necessary to place the eggs in water for picking. The incubator was utilized again in the autumn when, on November twelfth, 35 trays carrying 140,840 green salmon eggs were laid down. The loss until March twenty-second 1944 was 11.8 per cent as compared with 12 per cent in control troughs containing the same number of eggs and 13.9 per cent in the general group. This season the eggs in the incubator started to hatch a few days before those in the troughs.

The exterior of the hatchery, icehouse, coalshed and the watchman's building at Stevens ponds were painted. Trout fishing was reported as the best in a number of years. The Fish Forest and Game Associations assisted by supplying boats and the Fishery Inspectors helped to locate suitable distributing grounds.

The Nictaux rearing station was opened the week ended April 10 to receive 400,000 Atlantic salmon fry from Middleton and 449,600 eyed eggs of the same species from Cobequid. Ten thousand fry were distributed and 799,550 moved to Stevens ponds, the week of May 22, for rearing.

## YARMOUTH HATCHERY

*F. F. Annis, Superintendent*

The hatchery ponds produced 794,100 speckled trout eggs which is more than double the previous year's yield. Eggs received in February and April were 1,000,000 speckled trout from Antigonish and 298,500 Atlantic salmon from Cobequid; and in November 990,000 speckled trout from Antigonish and 752,500 Atlantic salmon from River Philip. In May and early June 250,000 Atlantic salmon and 50,000 speckled trout fingerlings were transferred to Mersey rearing station. Distributions from Yarmouth hatchery were 192,800 salmon and 280,600 trout, including 16 of the former, five years old, marked by the removal of the adipose and right ventral fins.

The exterior of the dwelling was stained, feed room painted, summer kitchen door moved from North to South side and grounds improved. Fishing was reported better than in past seasons. The Fishery Inspectors supplied information as to conditions of streams and lakes when called on and were present at distributions if requested.



## CHARLO HATCHERY

*R. O. Barrett, Superintendent*

The fish from the hatchery ponds produced 521,800 speckled trout eggs which were supplemented by receipt of 150,000 same species from Antigonish in March and 1,051,300 Atlantic salmon eggs from New Mills pond in October and November. Output for the season was 1,472,900 salmon and 75,400 trout of which 200 number 3 trout fingerlings were marked by removal of the adipose fins.

In selective breeding 51 pairs of 2 year old trout were used and their eggs segregated for further selection later. The yield was 1,177 per female as against 676 in the general group of the same age. Four circular ponds were lined, each with a 3-inch thickness of cement, and the brood stock pond repaired. The woodwork of the main hatchery was painted, also the sub-hatchery. The water supply pipe line froze in December making it necessary to pack the eggs in cases from the fifteenth to the twenty-fourth and to move the fingerlings and adult fish to the spring above the hatchery. The Dalhousie branch of the Fish and Game Association was interested in the operation of the hatchery and assisted with boats and service at times in making distributions. A swamp flowage, presumably barren, whose outlet is blocked by a dam, was stocked in 1941 with 200 speckled trout fingerlings and this year 8 trout were taken on one rod in about an hour. They were uniform in size measuring approximately 16 inches long and weighing from  $2\frac{1}{4}$  to  $2\frac{1}{2}$  pounds each.

## FLORENCEVILLE HATCHERY

*J. M. Butler, Superintendent*

The collection of speckled trout eggs from the hatchery ponds in October and November was 387,500 which was supplemented by receipt of 700,000 Atlantic salmon eggs from Kelly's on February 13 and 350,000 speckled trout eggs from Antigonish on March 6. In November the following eggs were also received—1,007,400 Atlantic salmon from Miramichi, 1,000,000 speckled trout from Saint John and 5,000 same species from Lindloff. Distributions for the year were 1,394,000 Atlantic salmon, 12,900 sebago salmon and 1,742,400 speckled trout. All of the sebagos and 3,050 of the trout were marked by removal of the adipose and left pectoral fins.

In selective breeding 12 pairs of selected 2 year old speckled trout were mated and the eggs segregated for further selection later. The selected group yielded 1,000 eggs per female as against 537 per female in the general group.

Improved angling was reported in some districts. The main hatchery, dwelling, old garage and icehouse were painted, main hatchery and dwelling roofs resingled and grounds improved generally.

## GRAND FALLS HATCHERY

*W. A. McCluskey, Superintendent*

In March and April 501,150 Atlantic salmon eggs were received from Cobequid, and 1,350,000 speckled trout from Antigonish; and in the autumn 1,399,200 Atlantic salmon from Miramichi pond. Distributions for the year were 1,651,100 salmon and 422,000 trout. The Grand Falls branch of the New Brunswick Fish and Game Association gave assistance in planting fingerlings in the headwaters of the Salmon River. The long wooden ponds were repaired and icehouse and stable resingled.

## MIRAMICHI HATCHERY AND SALMON-RETAINING POND

*Frank Burgess, Superintendent*

In March, 200,000 speckled trout eggs were received from Antigonish and in October and November 6,063,100 Atlantic salmon from the Miramichi pond.



On March 25, 1,000,000 salmon eggs were forwarded to Saint John hatchery. Distributions for the season were 3,350,200 Atlantic salmon and 140,800 speckled trout. A sixty-foot wing at the dam was renewed, the garage walls realigned, some troughs rearranged and considerable painting done to hatchery, dwelling and other buildings. Fly fishing in the district was reported good and the commercial drift net and set net fishermen are said to have had a successful season.

The parent salmon, as usual, for the Miramichi pond were purchased by tender and contract, and from September 10 to 28, one thousand eight hundred and fifty-four, averaging 8.9 pounds in weight, were impounded. Between October 19 and November 10 one thousand two hundred and five females were stripped, yielding 8,469,700 eggs, which were allotted as follows—6,063,100 to Miramichi, 1,399,200 to Grand Falls and 1,007,400 to Florenceville hatchery.

#### NEW MILLS SALMON-RETAINING POND

*William White, Superintendent*

Between May 29 and July 17, three hundred and seventy-six Atlantic salmon of the early run, averaging 13.9 pounds, purchased from 9 commercial fishing stands of the district, were delivered and impounded at New Mills pond. At stripping time, October 25 to November 8, one hundred and forty-nine females yielded 1,051,300 eggs, which were all laid down for incubation in the Charlo hatchery. Only 9 salmon were lost during the retention period from May to November. Twenty-nine salmon were marked in June by affixing tags to the dorsal fins; 15 of these tags were of metal and 14 of celluloid. At spawning: time 12 fish were captured bearing tags—10 metal, 2 celluloid.

#### SAINT JOHN HATCHERY

*K. G. Shillington, Superintendent*

Last year's record collection of speckled trout eggs from the hatchery ponds was exceeded with a take of 8,004,500. Of these 785,500 were laid down in Spring brook, 1,000,000 sent to Florenceville and the balance, 6,219,000, placed in the Saint John hatchery for incubation. The ponds also produced 22,800 rainbow trout eggs. Receipts of eggs from other points were—1,000,000 Atlantic salmon from Miramichi March 26, 20,800 sebago salmon from Chamcook and Gibson Lakes November 5 to 18, 32,000 speckled trout from Lake Utopia October 9 to November 5 and 5,000 same species, McRae Lake cross, from Lindloff November 11. Thirty-five parent rainbow were secured from Crooked creek September 2. Distributions for the season were—687,350 Atlantic salmon, 716,100 speckled trout, 36,800 sebago salmon and 2,200 rainbow. Included in these were 9,303 speckled trout fingerlings and fish two years old marked by removal of the adipose and right or left ventral and 6,183 seabagos one and two years of age marked by removal of the adipose and left ventral fins. In addition, 575,600 speckled trout eggs were planted in Spring brook on January 16. Eleven pairs of the best three year old and 52 pairs of the best two year old speckled trout were mated in selective breeding. The average egg yield per female in the three year selected stock was 3,643 as against 2,486 in the general group and in the two year selected stock, 2,644 as against 1,879 in the general group.

A test to determine whether fish resultant from small eggs attain the size of those hatched from larger eggs was carried out at Saint John hatchery. An equal number of small and large eggs were taken from each of several females. When laid down the small eggs were only 70.6 per cent of the size of the larger. When weighed on October 17, 1942, the fingerlings resultant from the small eggs were 89.2 per cent of those from the larger; when as yearlings they were weighed on December 3, the females from the large eggs weighed 8.8 ounces and from the small eggs 11.5 ounces; the males from the large eggs averaged 11.9 ounces and from the small eggs 13.2 ounces.

As a capacity test 35,000 eggs were laid down in each of two troughs on March 8 and 70,000 in each of two similar troughs on the same date. The loss to May 29 in the former was 52 per cent and in the latter 49.

A new 8-inch wood pipe was connected to the small ponds below the road. The two 14-inch pipes were extended out about 60 feet into the reservoir above the dam and the large pipe line from the dam was covered. An August freshet which flooded the ponds caused mixing but little loss or escape of fish as the ponds were enclosed as soon as there was evidence of dangerous water levels. The attic of the dwelling was insulated, three lights installed around the ponds, the mink fence repaired and painting done to fence, house and hatchery. Fishing was reported good in most districts, including McFadden, Blindman and Blackall Lakes, Turtle creek and Cloverdale River.

Operations at Chamcook and Gibson Lakes were carried on with the assistance of the district supervisors of fish culture and under their general supervision. Due to continual spates, efforts to collect fish were not as successful as had been hoped for. At Chamcook 51 sebago salmon averaging  $1\frac{1}{2}$  pounds in weight were caught between October 25 and November 15. Twelve thousand seven hundred eggs were obtained from 13 females and transferred to Saint John hatchery. Fifty-seven per cent of the sebgos handled had fins missing, having been marked and distributed previously from the Saint John hatchery. At Gibson Lake, where eggs were collected this year for the first time, 50 sebgos averaging  $1\frac{1}{2}$  pounds were retained between October 20 and November 12. Eight thousand one hundred eggs were taken from 10 females for the Saint John hatchery. Thirty-four per cent of the number retained were hatchery fish having fins missing.

#### CARDIGAN REARING PONDS

*C. Sayer, Superintendent*

The ponds were in operation from May 10 to October 12. From May 19 to 22 Kelly's supplied 650,000 speckled trout advanced fry and 60,000 Atlantic salmon No. 1 fingerlings. The output for the season was 47,300 salmon and 222,200 trout, of which 13,000 of the latter were marked by removal of the adipose and left pectoral fins. Six rearing troughs and one head trough were built, the grounds improved and the dwelling, icehouse, garage and feed room painted.

#### KELLY'S POND HATCHERY AND MORELL RIVER SALMON-RETAINING POND

*C. A. Tait, Superintendent*

A collection of 97,750 speckled trout eggs was made from the hatchery pond and 10,600, same species, from Watts stream at York. Other eggs received were 1,500,000 speckled trout from Antigonish March 13, and 1,493,400 Atlantic salmon from Morell pond November 9 to 22. On February 11 seven hundred thousand Atlantic salmon eggs were shipped to Florenceville and from May 19 to 22 sixty thousand Atlantic salmon No. 1 fingerlings and 650,000 speckled trout advanced fry to Cardigan. Distributions for the year were 515,600 salmon and 488,700 trout. Repairs were made to the plank face of the dam at the hatchery, the side walls of the flume and a portion of the cement wall of the hatchery. Rainbow trout were reported caught in Scales pond and East River.

At Morell salmon pond, Assistant C. H. Cooper was in charge. Between October 4 and November 8 three hundred and eighteen salmon averaging 9 pounds in weight were caught and impounded. From 191 females, November 9 to 22, one million four hundred and ninety-three thousand four hundred eggs were secured for Kelly's pond hatchery. Thirty salmon were tagged—15 with celluloid tags and 15 with metal. A new dam on Dunphy's stream was built to replace the old one there. One end of the scow was redecked and caulked and some improvements made to the officer's cabin.

# REPORT OF THE DEPUTY MINISTER

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## STATEMENT BY SPECIES OF LOCAL COLLECTION AND DISPOSAL OF EGGS DURING 1943

Species	Collection area	Eggs collected	Number collected	Disposal—Establishment at	Eggs received	Number	Totals
Atlantic salmon.....	Margaree pond, N.S.	Nov. 15-Dec. 1..	3,836,870	Lindloff	Nov. 23	1,117,270	
	River Philip, N.S.	Nov. 3-26.....	6,724,990	Margaree Bedford Cobequid Middleton Yarmouth Dalhousie University, Halifax, N.S. Bedford Florenceville Grand Falls Miramichi Kelly's pond Saint John Grand Lake Grand Lake Saint John	Nov. 16-Dec. 2 Nov. 5-16 Nov. 10-26 Nov. 12, 18 Nov. 14 Nov. 10 Nov. 2-16 Nov. 3 Oct. 28, Nov. 3 Oct. 20-Nov. 10 Oct. 26-Nov. 9 Nov. 9-22 April 19-May 12 Nov. 4-27 Nov. 2-23 Nov. 5-18 Oct. 31-Nov. 25 Nov. 11-25	2,719,600 1,557,290 3,361,120 1,022,090 752,490 32,000 520,730 1,007,400 1,399,200 6,063,120 1,051,320 1,493,440 22,800 53,330 81,430 12,670 8,130	
Rainbow trout Sebago salmon	Sackville River, N.S.	Nov. 2-16.....	520,730	Antigonish	Oct. 31-Nov. 25	8,555,380	
	Miramichi pond, N.B.	Oct. 19-Nov. 10..	8,469,720	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
Speckled trout.....	New Mills pond, N.B.	Oct. 25-Nov. 8...	1,051,320	Antigonish	Oct. 31-Nov. 25	8,555,380	
	Morell River, P.E.I.	Nov. 9-29	1,493,440	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	155,560
	Grand Lake rearing ponds, N.B.	April 19-May 12.	22,800	Antigonish	Oct. 31-Nov. 25	8,555,380	
	Grand Lake rearing ponds, N.S.	Nov. 4-27	53,330	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
	Chamcook Lakes, N.B.	Nov. 2-23	12,670	Antigonish	Oct. 31-Nov. 25	8,555,380	
	Gibson Lake, N.B.	Nov. 5-18	8,130	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	155,560
	Antigonish hatchery ponds, N.S.	Oct. 31-Nov. 25.	8,744,180	Antigonish	Oct. 31-Nov. 25	8,555,380	
		Nov. 11-25.....	(a) 3,301,200	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
	Grand Lake rearing ponds, N.S.	Nov. 8-23	20,510	Antigonish	Oct. 31-Nov. 25	8,555,380	
	Lindloff hatchery ponds, N.S.	Oct. 27-Nov. 20.	1,123,100	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
	McRae Lake, Richmond County, N.S.	Oct. 6-18.....	277,600	Antigonish	Oct. 31-Nov. 25	8,555,380	
				Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
	Margaree hatchery ponds, N.S.	Oct. 20-Nov. 25.	1,943,960	Antigonish	Oct. 31-Nov. 25	8,555,380	
	Yarmouth hatchery ponds, N.S.	Nov. 11-19.....	(a) 1,021,680	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
	Charlo hatchery ponds, N.B.	Oct. 26-Dec. 2.	277,770	Antigonish	Oct. 31-Nov. 25	8,555,380	
	Florenceville hatchery ponds, N.B.	Nov. 18-Dec. 2.	(a) 516,290	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
	Saint John hatchery ponds, N.B.	Oct. 25-Nov. 19.	521,780	Antigonish	Oct. 31-Nov. 25	8,555,380	
		Oct. 22-Nov. 29.	315,330	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
	Trout and Spear's brooks, Charlotte County, N.B.	Nov. 13-29.....	72,180	Antigonish	Oct. 31-Nov. 25	8,555,380	
	Southport (Kelly's pond) hatchery pond, P.E.I.	Nov. 1-Dec. 9.	7,252,540	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
		Nov. 19-Dec. 3.	(a) 752,000	Antigonish	Oct. 31-Nov. 25	8,555,380	
				Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
		Oct. 9-Nov. 5.....	31,970	Antigonish	Oct. 31-Nov. 25	8,555,380	
		Nov. 20-Dec. 24.	97,750	Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
				Antigonish	Oct. 31-Nov. 25	8,555,380	
				Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800
				Antigonish	Oct. 31-Nov. 25	8,555,380	
				Bedford Middleton Yarmouth Grand Lake Lindloff Lindloff Antigonish Cobequid Margaree Florenceville Saint John	Nov. 6 Nov. 9, 15 Nov. 9 Nov. 8-23 Oct. 27-Nov. 20 Oct. 6-18 Nov. 10 Nov. 10 Nov. 22 Nov. 12 Nov. 11 Oct. 20-Nov. 25	1,000,000 1,500,000 990,000 20,510 1,123,100 252,600 5,000 5,000 5,000 5,000 5,000	22,007,070 22,800

(a) Eggs from yearling fish. A total of 10,150 speckled trout eyed eggs for Kelly's Pond hatchery was purchased from Harold Watts, York, P.E.I.

In the interest of economy and convenience in distribution the following transfers were made in 1943:—

Species	Stage	From	To	Number	Date received
Atlantic salmon...	(e)	Bedford.....	Grand Lake.....	331,200	June 14-17
	(c)	Cobequid.....	Antigonish.....	1,002,300	April 1
	(c)	".....	Nictaux.....	449,570	April 9
	(c)	".....	Yarmouth.....	298,480	April 9
	(c)	".....	Grand Falls.....	501,150	March 26
	(d)	Middleton.....	Kejimkujik.....	200,000	May 26-30
	(d)	Middleton.....	Nictaux.....	400,000	Week April 10
	(d)	Nictaux.....	Middleton.....	799,550	Week May 22
	(e)	Yarmouth.....	Mersey.....	250,000	May 21-June 2
	(c)	Miramichi.....	Saint John.....	1,000,000	March 26
	(c)	Kelly's Pond.....	Florenceville.....	700,000	February 13
	(e)	Kelly's Pond.....	Cardigan.....	60,000	May 22
Speckled trout...	(c)	Antigonish.....	Bedford.....	1,200,000	February 24
	(c)	".....	Cobequid.....	1,500,000	April 1
	(e)	".....	Grand Lake.....	46,010	October 1-27
	(c)	".....	Lindloff.....	1,000,000	March 18
	(c)	".....	Margaree.....	300,000	March 24
	(c)	".....	Middleton.....	1,200,000	March 25
	(c)	".....	Yarmouth.....	1,000,000	February 25
	(c)	".....	Charlo.....	150,000	March 13
	(c)	".....	Florenceville.....	350,000	March 6
	(c)	".....	Grand Falls.....	1,350,000	March 6, April 3
	(c)	".....	Miramichi.....	200,000	March 12
	(c)	".....	Kelly's Pond.....	1,500,000	March 13
	(e)	Bedford.....	Coldbrook.....	50,000	May 31
	(e)	Middleton.....	Coldbrook.....	350,000	May 29-June 3
	(d)	".....	Kejimkujik.....	100,000	May 17, 18
	(e)	".....	Kejimkujik.....	100,000	May 19, 20
	(e)	Yarmouth.....	Mersey.....	50,000	May 29
	(d)	Kelly's Pond.....	Cardigan.....	650,000	May 19-21

(c) Eyed eggs. (d) Fry. (e) Fingerlings.



## EGGS, FRY, FINGERLINGS AND OLDER FISH ON HAND END OF CALENDAR YEAR 1943

Establishment	Species	Eggs	Fry	Fingerlings	1 year	2 year	3 year	4 year	5 year and older	Total by species	Total by hatchery
Antigonish	Atlantic salmon Speckled trout	7,946,870	4,800	18,000	50 7,885	3,226				50 7,980,881	7,980,931
Bedford	Atlantic salmon Speckled trout	1,884,600 879,320								1,884,600 879,320	2,763,920
Cobequid	Atlantic salmon Speckled trout	3,308,550	4,710							3,308,550 4,710	3,313,260
Grand Lake	Atlantic salmon Sebago salmon Speckled trout	106,170 11,120		59,657 10,000 39,818	3,454 110	915	44	115	8	59,657 120,706 51,048	231,411
Lindloff	Atlantic salmon Speckled trout	1,100,770 983,590	184,850	5,075	8	796			1,436	1,100,778 1,175,747	2,276,525
Margaree	Atlantic salmon Speckled trout	2,664,580 1,996,800	4,970	15,847	10 7,769	2,399				2,664,590 2,027,785	4,692,375
Middleton	Atlantic salmon Speckled trout	945,400								945,400	
Yarmouth	Atlantic salmon Speckled trout	740,690 1,447,710								740,690	
Charlo	Atlantic salmon Speckled trout	1,035,900 473,640		4,283	1,166	900	148	23		1,454,230	2,194,920
Florenceville	Atlantic salmon Sebago salmon Speckled trout	968,730 1,070,820		37,960 28,627		645	583			1,035,900 474,868	1,510,768
Grand Falls	Atlantic salmon	1,344,180								1,006,690 91	2,109,011
Miramichi	Atlantic salmon	5,786,700								1,102,230 110	1,344,180
Saint John	Rainbow trout Sebago salmon Speckled trout	17,750 5,493,700		38,224 38,647	909 1,699	260 5,539	53			53 268 56,883	5,601,279
Kelly's Pond	Atlantic salmon Speckled trout	1,419,280 94,530								1,419,280 94,530	1,513,810
		42,853,500	203,820	296,138	24,041	15,810	1,425	294	1,562	43,396,590	43,396,590

## DISTRIBUTIONS

## KEY TO ABBREVIATIONS

*Species—*

A Atlantic salmon  
S Speckled trout  
R Rainbow trout  
L Landlocked or Sebago salmon

*Stage of Development—*

a Green eggs  
b Eyed eggs  
c Fry  
d Advanced fry  
1 No. 1 fingerlings  
2 No. 2 fingerlings  
3 No. 3 fingerlings  
4 No. 4 fingerlings  
5 No. 5 fingerlings  
f Yearlings  
g Two years  
h Three years  
k Older fish

## CLASSIFICATION

Advanced fry: Fry that are feeding systematically.

## Fingerlings:

No. 1. Feeding from two to eight weeks.  
No. 2. Feeding from eight to fourteen weeks.  
No. 3. Feeding from fourteen to twenty weeks.  
No. 4. Feeding from twenty to twenty-six weeks.  
No. 5. Feeding from twenty-six weeks to one year from date of hatch.

## NOVA SCOTIA

## ANTIGONISH HATCHERY

*Antigonish County—*

Afton River—50,000 S1.  
Beaver Meadow River—50,000 Sd, 20,000 S1, 5,000 S3.  
Big brook—South River—50,000 Sd, 2,500 S3.  
Black River—30,000 Sd, 35,000 S1, 2,500 S3.  
Brierly brook—40,000 S1.  
Copper Lake—60,000 S1, 1,112 Sh.  
Delhanty Lake—60,000 S1.  
Gaspereaux Lake—1,092 Sh.  
Glenroy River—35,000 Sd, 30,000 S1, 5,000 S3.  
James River—60,000 Ad, 30,000 A1.  
MacAdam brook—5,000 S2.  
MacGillivray Lake—South River—736 Sg.  
Maryvale or Malignant brook—30,000 S1.  
McMillan Lake—600 Sf, 725 Sg.  
McLean or Cameron Lake—Beaver Meadow River—10,000 S2, 750 Sf.  
Meadow Green River—30,000 Sd, 45,000 S1, 2,500 S3.  
Middleton Lake—60,000 S1.  
North Lake—60,000 S1.  
North River—5,000 S2.  
Pinevale brook—30,000 Sd.  
Pinevale Lake—1,092 Sh.  
Polson brook—South River—40,000 Sd, 2,500 S3.  
Rights River—60,000 Ad.  
South River—60,000 A1.  
South River Lake—100,000 S1, 5,000 S3, 533 S4, 1,094 Sh.

South Lake—40,000 S1.  
Springfield brook—Glenroy River—30,000 Sd.  
West River—50,000 Sd, 60,000 S1, 10,000 S3, 600 Sf.

*Guysborough County—*

Black Lake—West River St. Mary—2,500 S3.  
Canter Lake—35,000 S1.  
Cole Harbour Lakes—30,000 S1.  
Cooee Coffre Lake—80,000 S1.  
Country Harbour River—60,000 A1.  
Cudahys Lake—50,000 S1, 2,000 S3.  
Dobson Lake—90,000 S1, 725 Sg.  
Donahue Lake—80,000 S1, 7,500 S3, 725 Sg.  
Doyle Lake—50,000 S1, 2,000 S3.  
East Barren Lake—West River St. Mary—5,000 S2.  
Ecumsecum River—120,000 S1.  
Eight Island Lake—50,000 S1.  
Fitzgerald Lake—40,000 S1, 3,500 S3.  
Giant Lake—110,000 S1, 5,000 S3.  
Goldboro or Goldbrook Lake—40,000 S1.  
Goshen Lake—5,000 S3.  
Guysborough River—60,000 S1.  
Hydro dam, Havre Bouche River—100,000 S1.  
Hazel Hill Lake—70,000 S1.  
Indian Harbour Lake—80,000 S1.  
Jellow Lake—100,000 S1, 5,000 S3, 600 Sf, 725 Sg.  
Kennedy Lake—40,000 S1, 4,500 S3.  
Mannassette Lake—60,000 S1.

*Guysborough County—Con.*

McInnis (Joe's) Lake—60,000 S1, 2,118 S3.  
 McPherson Lake (Port Shoreham)—60,000 S1.  
 Narrow Lake—60,000 S1.  
 Porter River—40,000 S1.  
 Pot Lake—West River St. Mary—5,000 S2.  
 Pringle Lake—400 Sh.  
 East River St. Mary—80,000 Ad, 130,000 A1, 17,500 A2.  
 West River St. Mary—160,000 A1, 17,500 A2.  
 Salmon River—60,000 A1, 50,000 S1.  
 Seal Harbour Lake—35,000 S1.  
 Sherbrook Lake—80,000 S1, 750 S2.  
 Sullivan Lake—50,000 S1, 2,000 S3.  
 Taylor Lake—East River St. Mary—15,000 S2.  
 Three Mile Lake—30,000 S2.  
 Tracadie River—40,000 A1.  
 Trout Lake—West River St. Mary—2,500 S3.  
 Two-mile Lake—East River St. Mary—20,000 S2.

*Pictou County—*

Barney River—40,000 Ad, 25,000 A1, 50,000 S1.  
 Big brook—East River—50,000 S1, 5,000 S3.  
 Brora Lake—20,000 S2.  
 Calder Lake—25,000 S2.  
 Campbell Lake—French River—15,000 S2.  
 Caribou River—1,000 S1.  
 Little Caribou River—2,000 S4.  
 East River—75,000 A1, 90,000 S1.  
 East River, West branch—45,000 S1, 5,000 S3.  
 Blue Mountain dam, French River—20,497 S2.  
 French River—30,000 Ad.  
 French River branch (French River Settlement)—50,000 S1.  
 Lansdowne Lake—15,000 S3.  
 McLellan brook—50,000 S1, 5,000 S2.  
 McLellan Lake—20,000 S2.  
 McPherson Lake—20,000 S2.  
 Middle River—35,000 A1.  
 Sixmile brook—25,000 S1.  
 Sutherland River—50,000 S1.  
 West River—75,000 S1, 10,000 S3.

## BEDFORD HATCHERY

*Halifax County—*

Canibou Lake—Porter Lake—30,000 S1.  
 Fish or Fishing Lake—West River Sheet Harbour—25,000 S1.  
 Lewis Lake—East River—24,475 S1.  
 Lily Lake—Bedford Basin—10,525 S1.  
 Maxwell Lake—Sackville River—25,000 S1.  
 Mill Lake—Musquodoboit River—25,000 S1.  
 Ninemile River—50,000 A1.  
 Sackville River—42,020 A1.  
 Upper or Little Sheldrake Lake—11,278 S2.

*Hants County—*

Coxcomb or Cockscomb Lake—25,000 S1.  
 Pigott Lake—25,000 S1.

*Lunenburg County—*

Gold River—47,332 A2.  
 Middle River—23,417 A2.  
 Mill Lake—Barry brook—25,000 S1.

## COBEQUID HATCHERY

*Albert County—*

Pollett River—18,000 A1.

*Colchester County—*

Debert River—12,000 S2, 5,000 S3.  
 East River, at Five Islands—6,000 S3.  
 Economy Lake—4,500 S3.  
 Folly Lake—7,500 S2, 9,750 S3.  
 French River—20,000 S1, 5,000 S3.  
 Irving Lake—3,000 S2.  
 Long Lake—French River—3,000 S2.  
 Newton Lake—4,500 S3.  
 Rocky Lake—French River—2,000 S3.  
 Shatter Lake—3,000 S2.  
 Silica Lake or Bass River Lake—3,600 S3.  
 Simpson Lake—18,000 S1, 5,000 S3.  
 Snare Lake—4,000 S2.  
 Waughs River—12,000 S2, 5,000 S3.  
 West branch Lake—River Philip—3,000 S3.  
 Whirley Wha Lake—4,000 S2.

*Cumberland County—*

Amherst pond (Reservoir) and tributaries—  
 Nappan River—11,341 S3.  
 Biswanger brook—River Philip—2,500 S3.  
 Brownell brook—Shinimikas River—2,500 S2.

Coulter Lake, upper—2,500 S2.  
 Doherty brook—3,000 S2.  
 Fountain Lake—4,000 S3.  
 Fox River (Greville Bay)—20,000 S1.  
 Isaac Lake—6,000 S1.  
 Leak Lake—5,000 S2, 4,000 S3.  
 Little Lake—Newfound Lake—3,000 S1.  
 Maccan River—25,000 S1, 10,000 S3.  
 McLeod Lake—4,000 S2.  
 Mountain brook—3,750 S3.  
 Newfound Lake—9,000 S1.  
 Parrsboro Aboiteau—5,000 S2, 4,000 S3.  
 River Philip—22,500 A2.  
 River Philip, west branch—7,000 S3.  
 River Philip, east branch—5,000 S3.  
 Pugwash River—13,000 S3.  
 Ramshead Lake—3,000 S2.  
 Sugarloaf brook—6,750 S3.  
 Sutherland Lake—18,000 S1, 8,000 S3.  
 Tillies brook—6,000 S3.  
 Wallace River—30,000 S1, 10,000 S3.  
 Wallace River, west branch—5,000 S3.

*Westmorland County—*

Calhoun brook—Silver Lake or Morice pond—5,600 S3.

COBEQUID HATCHERY—*Con.**Westmorland County—Con.*

Fawcett brook-Silver Lake or Morice Pond  
—5,000 S3.  
Harper brook-Tantramar River—5,000 S3.  
Jenks brook—Tantramar River—6,400 S3.

North brook—Musquash Lake—5,000 S2.  
North River—44,000 A2.  
C.N. Reservoir brook-Tantramar River—  
1,000 S3.  
Robinson brook-Tantramar River—10,000  
S2.

## COLD BROOK PONDS

*Kings County—*

Annapolis River—25,000 S4.  
Aylesford Lake—15,000 S3, 20,000 S4.  
Brandywind brook-Cornwallis River—6,000  
S3.  
Burke Lake—7,000 S3, 8,000 S4.  
Cambridge brook-Cornwallis River—6,000  
S3.  
Canard River—10,000 S3, 10,000 S4.  
Cold brook-Cornwallis River—2,010 S3,  
2 S4.  
Cornwallis River—23,000 S3.

Crooked Lake—5,000 S4.  
Gaspereau Lake—9,000 S3, 20,000 S4.  
Lake George—9,000 S3, 21,000 S4.  
Habitant River—15,657 S4.  
Hardwood Lake—5,000 S4.  
Mack Lake—10,000 S3, 10,000 S4.  
Murphy Lake—6,000 S3, 24,000 S4.  
Lake Paul—9,000 S3, 20,000 S4.  
Lake Torment—9,000 S3, 16,000 S4.  
Trout River—7,000 S3, 5,000 S4.  
Tupper brook-Cornwallis River—3,000 S3.  
Turbett Lake—10,000 S3, 5,000 S4.

## GRAND LAKE PONDS

*Colchester County—*

Little, Island and Double Lakes—1,600 Sf.  
Stewiacke River—10,000 A3.

*Halifax County—*

"A" Lake—1,000 Sf.  
Black Point Lake—2,000 Sf.  
Blueberry Lake—800 Sf.  
Chezzetcook River—10,000 A3.  
Goose Lake-Porter Lake—1,800 Sf.  
Halfmile Lake—800 Sf.  
Hatchet Lake—2,000 Sf.  
Ingram River—10,000 A3.  
Kieley Lake—1,000 Sf.  
Long Lake-Little Salmon River—2,000 Sf.  
Mill Lake-Hubbard River—1,800 Sf.  
Moody Lake—1,500 Sf.  
Musquodoboit River—20,000 A3.  
Ninemile River—10,000 A3.  
Pace Lake—1,400 Sf.  
Upper Petpeswick, Long Bridge or Bridge  
End Lake—2,000 Sf.  
Pockwock Lake—2,000 Sf.

Ragged Lake—1,000 Sf.  
Rawdon River—10,000 A3.  
Sackville River—9,905 A3.  
Salmon River-Echo Lake—20,000 A3.  
Little Salmon River-Cole Harbour—10,000  
A3.  
Salmon River (Port Dufferin)—20,000 A3.  
Sheet Harbour Flowage-East River—1,300  
Sf.  
Ship Harbour River—10,000 A3.  
Shubenacadie (Grand) Lake—40 Sf, 82 Lh,  
49 Lk.  
Spider Lake—820 Sf.  
West River Sheet Harbour—15,000 A3.

*Hants County—*

Cameron Lake—1,000 Sf.  
Lewis Lake—1,800 Sf.  
Kennetcook River—20,000 A3.

*Lunenburg County—*

East River—10,000 A3.  
Spondo Lake—2,000 Sf.

## KEJIMKUIK PONDS

Lahave River—26,514 A4.  
Medway River and tributaries—102,830 A4.  
First Christopher Lake—6,000 S2.  
Brook between First and Second Christo-  
pher Lakes—2,800 S4.  
Fifteenmile brook—2,000 S2.  
Freeman Lake—1,000 S2.  
Harmony Lake—6,000 S2, 2,000 S3.  
Tupper Long Lake—4,000 S2.  
Whiteburn brook—4,000 S2.

*Mersey River—*

Beaverhead Lake—1,000 S2.  
Grafton brook—1,000 S3, 1,100 S4.  
Grafton Lake—6,000 S2, 3,000 S3, 784 S4.

Hunt Lake—1,500 S3.  
Kejimkujik Lake—28,600 S2, 3,000 S3,  
1,704, S4.  
Little River—12,000 S2, 1,704 S4.  
Upper Mersey (Maitland) River—12,000 S2,  
1,704, S4.  
Minard brook—3,600 S2.  
Minard Lake—8,000 S2.  
Mount Tom brook—3,600 S2.  
Red Lake—1,000 S2.  
Rodger brook—3,000 S2.  
Sweeney brook—2,400 S2.  
Westward or West River—12,000 S2, 994  
S4.



## LINDLOFF HATCHERY

*Cape Breton County—*

Belfry Lake—20,000 S1.  
 Canoe Lake—10,000 S3.  
 Catalogne Lake—20,000 S2.  
 Chain or String Lakes—Mira River—12,000 S3.  
 Cochran Lake—12,000 S2.  
 Dutch Brook Lake—12,000 S1.  
 Gabarus Lake—20,000 S1.  
 Gaspereaux River—25,000 A3, 25,000 A4.  
 Gillies Lake—East Bay—12,000 S2.  
 Grand Lake, near Louisburg—12,000 S2.  
 Hardy Lake—15,000 S3.  
 Kilkenny Lake—217 Sg.  
 Loon Lake—Mira Bay—12,000 S2.  
 McCormick Lake—15,000 S3.  
 Meadow brook—Sydney River—20,000 S1.  
 Mulcuish Lake—15,000 S2.  
 Salmon River—30,000 A2, 75,000 A4.  
 Stewart Lake—12,000 S1.

*Inverness County—*

Brawley Lake—12,000 S2, 3,000 S4.  
 McIntyre Lake (Grantville)—20,000 S1.  
 Pleasant Hill Lake—15,000 S1.

*Richmond County—*

Babins Lake (Madame Island)—15,000 S2.  
 Black River—15,000 S1.  
 Breen Lake—20,000 S1.

Chain Lake (Madame Island)—15,000 S1.  
 Falls Bay brook—189 Sh.  
 Ferguson Lake—15,000 S2.  
 Ferguson brook—12,000 S1.  
 Forest Lake (Madame Island)—15,000 S1.  
 Framboise River—25,000 A3, 25,000 A4.  
 Grand Lake (Madame Island)—15,000 S1.  
 Grand River—30,000 A2, 25,000 A4.  
 Indian Lake—15,000 S1.  
 Lindloff or Hatchery brook—30,000 A4.  
 Loch Lomond—30,000 A2, 25,000 A3, 50,000 A4.  
 MacLeod brook—12,000 S1.  
 Mary Ann's Lake—12,000 S1.  
 McIsaac Lake—15,000 S1.  
 McKenzie Lake—15,000 S1.  
 McNab Lake—15,000 S1.  
 Mill Lake—East River Tillard—15,000 S1, 1,959 S5.  
 Noels Lake (Madame Island)—15,000 S2.  
 Potties Lake (Madame Island)—15,000 S1.  
 Saint Esprit Lake—12,000 S1.  
 Scott brook—20,000 S1.  
 Shaw Lake (Madame Island)—15,000 S1.  
 Straughton brook—10,000 S1.  
 Thompson Lake—12,000 S1.  
 River Tillard, west—20,000 S1.  
 River Tillard, east—15,000 S1.  
 River Tom—15,000 S1.

## MARGAREE HATCHERY

*Cape Breton County—*

Belle Lake—15,000 S1.  
 Black brook—Mira River—10,000 S2.  
 Browns Lake—Indian Bay—15,000 S1.  
 Ferguson Lake (New Boston)—4,400 S2.  
 Forester Lake—10,000 S3.  
 Giovonetti Lake—10,000 S1.  
 Grand Lake—Indian Bay—10,000 S3.  
 Jackson or Johnson Lake—10,000 S3.  
 Keefe Lake—15,000 S1.  
 McDonald or Widow Lake (New Boston)—9,500 S2.  
 McInnes Lake—10,000 S2.  
 McIntyre Lake (New Boston)—15,000 S1.  
 McMillan Lake—10,000 S2.  
 McPherson Lake (New Boston)—10,000 S1.  
 Scotch or Scott Lake—10,000 S4.  
 Trout brook—Mira River—10,000 S2.

*Inverness County—*

Big brook—River Denys—20,000 S4.  
 Broad Cove River or Strathlorne brook—30,000 S1.  
 Cheticamp River—75,000 Ac, 75,000 Ad, 110,000 A1, 40,000 A2.  
 Farm brook—10,000 S1.  
 Galant River—25,000 S1.  
 Galant River, mouth of—50,000 A2.  
 Glen brook—River Denys—10,000 S3.  
 Glenora brook—5,000 S1, 150 Sf.  
 Grand Etang brook—10,000 S1.  
 Mabou River, southwest—30,000 S1.

Margaree River, northeast and tributaries—275,000 Ac, 80,000 Ad, 470,000 A1, 350,000 A2, 50,000 A3, 159 Af.  
 Big brook—20,000 S1.  
 Egypt brook—30,000 S1, 400 Sg, 110 Sh.  
 Forest Glen brook—20,000 S1.  
 Ingram (Ingraham) brook—60 Sf, 1,307 Sg.  
 McDonald brook—10,000 S1.  
 Levis brook—35,000 S1.  
 Murray brook—6,000 S1.  
 Lake O'Law brook—20,000 S3, 10,510 S5, 225 Sg.  
 Murphy brook—25,000 S1.  
 Lake O'Law, upper—10,000 S2, 8,000 S5, 240 Sg.  
 Lake O'Law—20,000 S4, 4,580 S5, 350 Sg, 127 Sh.  
 Fortune brook—20,000 S1.  
 Watson brook—10,000 S1.  
 Margaree River, southwest—150,000 Ac, 70,000 Ad, 180,000 A1.  
 Captain Allen's brook—40,000 S1.  
 Matheson Glen brook—30,000 S1.  
 McDonell brook—20,000 S1.  
 McLellan ponds—4,500 S3.  
 McColl brook—20,000 S4.  
 McKenzie brook—River Denys—20,000 S4.  
 McPherson brook—River Denys—20,000 S4.  
 Mull River—70,000 Ad, 30,000 A1.  
 Plaster ponds—112 Sh.  
 Plateau brook—50,000 S1.

MARGAREE HATCHERY—*Con.**Inverness County—Con.*

Rough brook-River Inhabitants—20,000 S4.  
 Skye brook—20,000 S1, 600 Sf.

*Victoria County—*

Aspy River, north—50,000 A2.  
 Aspy River, middle—50,000 A2.  
 Baddeck River—75,000 Ac, 75,000 A1.  
     Farquar Angus or McDonald brook—  
     40,000 S1.  
     Gillis brook—52,000 S1.  
     Peter brook—40,000 S1.  
 Barasois brook—40,000 S1.  
 Campbell brook (Estmere)—10,000 S1.  
 Carey Lake—2,000 S1.  
 Dalem Lake (Boularderie Island)—10,000  
 S1.  
 Giffin Lake—7,500 S3.

Ingonish River—30,000 A2.  
 McKinnon Harbour brook—10,000 S1.  
 McLean brook (Ottawa brook)—2,000 S1.  
 McNeil brook (Gillie Point)—10,000 S1.  
 McPhie brook (Southside Boularderie)—  
 2,000 S1.  
 Middle River—75,000 Ac, 75,000 Ad, 100,000  
 A1.  
     Beaver brook—31,000 S1.  
     Black brook—35,000 S1.  
     Cold brook—20,000 S1.  
     Indian brook—50,000 S1.  
     McDonald brook—33,200 S1.  
 Morrison Lake—7,500 S3.  
 North River—75,000 Ad, 100,000 A1, 125,000  
 A2.  
     Church brook—12,000 S1.  
 Washabuck River—25,000 S3.

## MERSEY PONDS

Mersey River and tributaries—192,700 A4.  
     Bon Mature brook—6,000 S4.  
     George brook—4,000 S4.

Lower Great brook—10,000 S4.  
 Upper Great brook—15,420 S4.

## MIDDLETON HATCHERY

*Annapolis County—*

Annapolis River—50,000 A1.  
 Barnes Lake—8,000 S4.  
 Boot Lake—10,000 S2.  
 Crisp brook—10,000 S2.  
 Elliott Lake—8,000 S3.  
 Fishers Lake—10,000 S3.  
 Grand Lake narrows—10,000 S3.  
 Lake LaRose—10,000 S2.  
 Lequille River—25,000 A2.  
 Little River-Annapolis River—10,000 S2.  
 McGill Lake—10,000 S2, 8,000 S3.  
 Morton brook—6,000 S2.  
 Nictaux River—100,000 A1, 75,000 A2,  
 80,000 A3, 25,000 S4.  
 Paradise Lake—12,000 S2.  
 Lake Pleasant—10,000 S2.  
 Ramsey (Rumsey) Lake—8,000 S3.  
 Round Hill River—25,000 A2.  
 Sandy (Sand) Lake—6,000 S2, 1,650 S4.  
 Sandy Bottom Lake—10,000 S2.  
 Shannon River—10,000 S2.  
 Slocumb brook—8,000 S2, 1,000 S4.  
 Thirty Lake—10,000 S2.  
 Lake Tommy—10,000 S2.  
 Trout Lake—10,000 S3.  
 Walker brook—10,000 S2.  
 Wiswal (Wiswell) brook—1,000 S4.  
 Zwicker Lake—10,000 S2.

*Digby County—*

Haines Lake—3,000 S3.  
 Mallett Lake—3,000 S3.  
 Porter or Mistake Lake—6,000 S3.

*Hants County—*

Avon River—25,000 A1.  
 Cameron Lake—7,000 S2.

Falls Lake stillwater—8,000 S3.  
 Murphy Lake-Avon River—7,000 S2.  
 Panuke Lake—18,000 S3.  
 Pigott Lake—8,000 S2.  
 Zwicker or Daniel Lake—8,000 S2.

*Kings County—*

Gaspereau River—50,000 A2, 30,000 A3.

*Lunenburg County—*

Butler Lake—10,000 S2.  
 Canoe Lake, south—10,000 S3.  
 Canoran or Canon Lake—6,000 S3.  
 Card Lake—15,000 S2.  
 Franey Lake—5,000 S2.  
 Gold River—40,000 A1, 25,000 A2.  
 Holbert Lake—9,000 S3.  
 Indian Lake-Gold River—6,000 S3.  
 Lahave River—40,000 A1, 25,000 A2.  
 Lewis Lake—6,000 S3.  
 Maligak or Malaga Lake—10,000 S3.  
 New Germany Lake—10,000 S2.  
 Ninevah Lake—10,000 S2.  
 Oakland Lake—8,000 S3.  
 Petite River—40,000 A3.  
 Ramsey Lake—8,000 S4.  
 Rocky Lake-Lahave River, between New  
 Germany and Caledonia—5,000 S2.  
 Veniot brook—5,000 S2.  
 Wentzell Lake—12,000 S2.  
 Whalen Lake—8,000 S3.  
 Whetstone Lake—10,000 S2.  
 Wiles stillwater-Lahave River—5,000 S2.  
 Lake William—10,000 S2.

## NICTAUX FALLS REARING STATION

Nictaux River—10,000 Ac.

## YARMOUTH HATCHERY

*Annapolis County—*

LeMarchant Lake—652 Sf.

*Digby County—*

Boarback Lake—50,000 S1.

Bullerwell brook-Carleton River—11,553 S1.

Carrying Road (Third) Lake—1,000 Sf.

Farish (Blackadar) Lake—5,620 A3, 16Ak.

Hanf brook-Carleton River—6,921 S1.

Salmon River—19,690 A3, 54,986 A4.

Salmon-river Lake—2,000 Sf.

Seven Pence Ha'penny River (Wentworth brook)—1,184 S4.

Wentworth Lake—2,500 Sf.

*Shelburne County—*

Clyde River—88,500 A1, 24,000 A4.

Roseway River—2,000 Sf.

*Yarmouth County—*

Carleton River—20,000 S3.

Ellenwood Lake—2 000 Sf.

Goudey Lake—3,000 Sf.

Harding brook-Carleton River—6,921 S1.

Lake Jesse—50,000 S1.

Big Meadow brook-Tusket River—453 Sf.

Little Meadow brook-Tusket River—20,000 S1.

Nickerson brook-Carleton River—13,842 S1.

Richardson Lake—15 Sk.

Ryerson brook-Carleton River—13,842 S1.

Salmon River, Gardner brook—300 Sf.

Salmon River, at Whithouse Mill—250 Sf.

Salmon River, at South Deerfield—255 Sf.

Sweeney brook-Carleton River—6,921 S1.

Trefry Lake—35,000 S1.

East Branch Tusket River—30,000 S1.

## NEW BRUNSWICK

## CHARLO HATCHERY

Charlo River, north branch, above dam—  
5,104 S3.

Christopher brook—6,098 S3.

Eel River—6,000 S3.

Jacquet River—61,200 A2.

Juniper Lake—1,000 S3.

Hariman Lake—25,000 Sd.

Henry's Lake-Charlo River—200 S3.

Loch Lomond—12,000 Sc.

Middle River—6,000 S3.

Nash creek—5,000 S3.

Nipisiguit River—100,800 Ad, 30,600 A2.

Restigouche River—298,200 Ad, 368,900 A2.

Kedgwick River—122,400 A2.

Matapedia River—197,400 Ad, 30,600 A2.

Upsalquitch River—201,600 Ad, 61,200 A2.

Robinson Lake—1,000 S3.

Walker brook—4,000 S3.

Black brook—4,000 S3.

## FLORENCEVILLE HATCHERY

*Carleton County—*

Acker brook-Saint John River—30,000 Sd.

Ash brook-Fewer Lake—25,000 Sd.

Becaguimec River—125,000 A1.

Birmingham brook-Becaguimec River—  
20,000 Sd.

Bubar brook-Saint John River—20,000 S1.

Bubby brook-Saint John River—15,000 Sd.

Bulls creek-Saint John River—40,000 S1,  
5,000 S5, 220 Sh, 80 Sk.

Bull creek-Eel River—50,000 S1.

Burnt Land brook-Becaguimec River—  
50,000 Sd, 20,000 S1.

Burpee brook-Presquile River—50,000 S1.

Buttermilk creek-Saint John River—8,000  
Sd.

Cold stream-Becaguimec River—60,000 S1.

Colton brook-Shiktahawk River—10,000  
Sd, 5,000 S1.

Cross creek-Becaguimec River—15,000 Sd.

Day brook-Becaguimec River—20,000 Sd,  
20,000 S1, 5,000 S4.Debec brook-Sherwood Lake—40,000 Sd,  
25,000 S1.Dingee brook-Presquille River—4,000 S1,  
25,000 S1.Drake brook-Meduxnekeag River—15,000  
S1.Gallivan brook-Little Presquile River—  
15,000 Sd, 5,000 S1.Gibson Mill brook-Saint John River—  
10,000 S3, 200 Sf, 150 Sg.Gin brook-Becaguimec River—20,000 Sd,  
15,000 S1, 50 Sg, 150 Sh.

Green Lake-Debec brook—125 Sf, 125 Sg.

Guisiguit River—50,000 S1, 100 Sf, 200 Sg.

Little Guisiguit River—50,000 S1, 300 Sg.

Hagerman brook-Meduxnekeag River—  
20,000 Sd, 200 Sh.Hardwood brook-Saint John River—10,000  
Sd.Harmon brook-Saint John River—15,000  
Sd.

Harold brook-Presquile River—15,000 Sd.

Hatfield brook-Saint John River—20,000  
Sd.Hayden brook-Becaguimec River—25,000  
Sd.Second or Upper Howard brook-Beca-  
guimec River—25,000 S1.

Lanes creek-Saint John River—20,000 Sd.

Lily brook-Saint John River—25,000 Sd.

Maynes brook-Little Presquile River—  
20,000 Sd.McLeary brook-Lakeville pond—30,000 Sd,  
40,000 S1.

McLeod brook-Bull creek—40,000 S1.

Meduxnekeag River—150,000 A1.

Mile brook-Presquile River—15,000 Sd.

Mill brook-Meduxnekeag River—15,000 S1.

Miramichi River, southwest and tribu-  
taries—315,000 A1, 8,500 A3, 25,525 Af.

Monquart River—60,000 A1.

FLORENCEVILLE HATCHERY—*Con.**Carleton County—Con.*

Payson Lake—6,000 S3.  
 Presquile River—150,000 A1.  
 Little Presquile River—310 Sk.  
 Priest brook—Priest Pond—4 000 Sd.  
 River des Chutes—30,000 Sd, 30,000 S1.  
 Saint John River—382 Sk.  
 Shiklahawk River—100,000 A1.  
 Little Shiklahawk River—25,000 A1.  
 Smith brook—Becaguimec River—10,000 Sd.  
 Smith pond—Southwest Miramichi River—  
 25,000 S1, 5,000 S3.  
 Stickney brook—Saint John River—10,000  
 S3.  
 Sucker brook—Lakeville pond—20,000 Sd.  
 Tweedie brook—Saint John River—5,000 Sd.

*York County—*

Artificial Lake—Keswick River—2,000 S1.  
 Brown Lake—15,000 S1, 5,000 S5.  
 Clinch brook—Little Magaguadavic Lake—  
 6,225 Lf.  
 Big Cranberry or Harvey Lake—30,000 S1,  
 5,000 S4.  
 Davidson Lake—20,000 S1, 200 Sg.  
 Dead creek—Eel River—40 000 S1, 5,000 S5.  
 Second Eel Lake—25,000 S1.  
 Frog Lake—5,000 S4.  
 Green Hill Lake—Keswick River—15,000 S1.  
 Keswick River—100,000 A1.  
 Jones Forks—Keswick River—50,000 S1.  
 Kingsley brook—Nashwaakis River—20,000  
 S1.

Longs creek—Saint John River—5,000 S4.  
 Mactaquac River—120,000 A1.  
 Nackawic River—60,000 A1.  
 Nashwaak River—115,000 A1, 10,000 A2.  
 Nashwaakis River—30,000 S1, 300 Sh.  
 Noonan brook—Portobello creek—40,000 S1,  
 5,000 S3.  
 Penniac brook—Nashwaak River—50,000 S1.  
 Pokiok River—40,000 S1, 5,000 S5.  
 Risteen brook—Eel River—15,000 S1.  
 Rusagonis River—40,000 S1.  
 Shogomoc River—50,000 S1, 340 Sk.  
 Skiff Lake—30,000 A1, 6,700 Lf.  
 Taffa Lake—25,000 S1.

## GRAND FALLS HATCHERY

*Victoria County—*

Saint John River and tributaries—638,000  
 Ad, 111,440 A1, 104,783 A2, 48,397 A3.  
 Four Falls brook—8,000 S1.  
 Hatchery brook, above falls—5,000 S1.  
 Little River—50,000 Sc, 50,000 Sd, 50,000  
 S1.  
 Salmon River and tributaries—195,000  
 Ad, 80,000 A2, 106,000 A3.  
 Lake Edward—10,000 Sd.  
 Sutherland brook—75,000 Sc, 50,000  
 Sd, 45,000 S1.  
 Tobique River and tributaries—50,000  
 Ad, 15,360 A1, 302,160 A2.  
 Pokiok brook—29,000 S1.

*Madawaska County—*

Grand River—25,000 Sd.  
 Siegas River—25,000 Sd.

## MIRAMICHI HATCHERY

Bartibog River—21,000 S1.  
 Black River—18,000 S1, 1,830 S2, 93 Sf.  
 Burnt Church River—21,000 S1.  
 Grand Aldouane River—4,200 S2.  
 Miramichi River, northwest and tribu-  
 taries—1,086,000 Ad, 74,000 A1, 172,-  
 800 A2.  
 Stewart brook—170Sf.  
 Miramichi River, southwest and tribu-  
 taries—588,800 Ad, 355,200 A1, 119,-  
 400 A2.  
 Black brook—4,500 S2.  
 Burnt Land brook—4,500 S2.  
 Long brook—4,500 S2.  
 Miramichi River, little southwest—630,000  
 Ad, 180,000 A1.  
 Napan River—9,000 S1.  
 Pokemouche River—14,000 S1.  
 Tabusintac River—96,000 Ad, 48,000 A1.  
 Eskedellie River—21,000 S1.  
 Little Tracadie River—14,000 S1.  
 Tweedie's Meadow brook—3 000 S2.

## SAINT JOHN HATCHERY

Atlantic Biological Station, St. Andrew's,  
 New Brunswick—87 S3.

*Albert County—*

Little or Coverdale River—500 Sg.  
 McFadden Lake—5,000 S1.  
 Turtle creek—400 Sg.

*Charlotte County—*

Bonaparte Lake—2,847 S4.  
 Campbells brook—Digdeguash River—350  
 S4.  
 Chamcook Lake—30,600 L3, 4,669 Lf, 1,514  
 Lg.  
 Clarence brook—Digdeguash River—500 S4.  
 Clear Lake—28,000 A3.  
 Craig brook—Craig Lake—350 S4.  
 Disappointment or Mistake Lake—20,000  
 Sc.  
 Gallop stream—Oak Bay—350 S4.  
 Goat brook—Canoose River—350 S4.  
 Green Brown brook—Canoose River—350  
 S4.  
 Limeburner Lake—14,547 S3.  
 Little Falls brook—Digdeguash River—350  
 S4.  
 Meadow brook—Oak Bay—350 S4.  
 Mohannas creek—350 S4.  
 Montgomery brook—Digdeguash River—  
 350 S4.  
 Piskahegan River—15,600 A4.  
 Sandy brook—Canoose River—350 S4.  
 Soap brook—Mohannas creek—350 S4.  
 Stewards brook—Mohannas creek—350 S4.

*Kent County—*

Buctouche River and South branch—845  
 S4.  
 Little Buctouche River—600 S4.  
 Cocagne River—300 S4.  
 Cocagne River, northwest branch—500 S4.



Mahalawodiac River or McKee Mills stream—600 S4.  
McDonald brook-Cocagne River—300 S4.  
Shediak River—300 S4.

#### *Kings County—*

Big Salmon River—60,000 A1.  
Chestnut brook-Smith creek—5,000 S1.  
Cornhill brook-Smith creek—10,000 S1.  
Crawford Lake—5,000 Sc.  
Dee brook-Smith creek—10,000 S1.  
Drury Cove brook-Kennebecasis River—10,000 S1.  
Hawks brook-Smith creek—5,000 S1.  
Kennebecasis River—170,000 A1, 40,000 A3.  
Kennebecasis River, south branch—10,000 S1, 250 Sg.  
King brook-Smith creek—10,000 S1.  
Markhamville brook-Hammond River—10,000 S1.  
McGregor brook-Smith creek—10,000 S1.  
McLeod brook-Kennebecasis River—20,000 S1.  
Mechanic Lake-Pollett River—450 Sg.  
Mill brook-Studholm brook or Millstream—10,000 S1.  
Pada brook-Trout creek—15,000 S1.  
Pleasant Ridge brook-Studholm brook or Millstream—10,000 S1.  
Sally brook-Smith creek—5,000 S1.  
Scalans Lake—1,000 S2.  
Stones brook-Kennebecasis River—10,000 S1.  
Ward creek-Trout creek—20,000 S1, 250 Sg.  
Windgap brook-Smith creek—5,000 S1.

#### *Queens County—*

Fish Lake-St. John River—7,000 Sc.  
Forks stream-Cannan River—8,000 S1.  
George or Long Lake—1,600 S4.  
McKenzie Lake, lower—2,790 S2, 210 S3.  
Newcastle creek—15,000 S1.  
O'Neil Lake—1,000 S1.  
Otnabog River—1,600 S4.  
Salmon River—150,000 A1.

#### *St. John County—*

Adams Lake—350 Sg.  
Back Dam-St. John River—300 Sf.  
Beaver brook-Mispek River—15,000 S1.  
Black River—20,000 S1.  
Blackall Lake—500 Sg.

Blindman Lake—350 Sf, 400 Sg.  
Boaz Lake—5,000 S1.  
Brandy brook—10,000 S1.  
Dead brook-Loch Lomond—25,000 S1.  
Dolan Lake—400 Sg.  
Douglas Lake—15,000 S1.  
Elderly brook-Little River—15,000 S1.  
Germaine brook—15,000 S1.  
Hanford brook—15,000 S1.  
Henry Lake—25,000 S1.  
Howe Lake—1,000 S1.  
Kelly Lake-St. John River—200 Sf, 75 Sg, 32 Sh.  
Lily Lake-Rockwood Park—400 Sg.  
Little River—2,120 R3, 56 Rg, 8 Rk, 2 Lf, 219 Sf, 652 Sg, 94 Sh.  
Second Lake-Loch Lomond—25,000 S1.  
Third Lake-Loch Lomond—25,000 S1.  
McCracken Lake—10,000 S1.  
Mispek River—25,000 S1.  
Mispek Fort Pond—1,000 S4.  
Stoker Lake—10,000 Sc.  
Treadwell Lake—5,000 S1.  
Tynemouth or Ten Mile creek—60,000 A1, 11,500 A4.  
Wilnot stream-Loch Lomond—25,000 S1.

#### *Sunbury County—*

Hardwood creek-Northwest Oromocto River—40,000 Sd.  
Oromocto River—150,000 A1.  
Oromocto River, northwest—500 Sg.  
Otter brook-Northwest Oromocto River—40,000 Sd.  
Scribner brook-South Oromocto River—5,000 Sd, 15,000 S1.  
Shin creek-South Oromocto River—40,000 S1.  
Tracy brook-Northwest Oromocto River—10,000 Sd.

#### *York County—*

Dead brook-North brook—500 S4.  
Digdeguash River—500 S4.  
Frog Lake—500 S4.  
Little McAdam brook—500 S4.  
Mink Lake—500 S4.  
Oromocto Lake—1,000 S4.  
Sears brook-St. Croix River—500 S4.  
Spring brook (James Vail)-Magaguadavic River—2,250 A3.

## PRINCE EDWARD ISLAND

### CARDIGAN PONDS

#### *Kings County—*

Bear River—4,000 S3.  
Big brook-Fortune River—3,000 S4.  
Big pond (Hermanville)—5,000 S3.  
Brudenell River—3,000 S4.  
Creed's pond-Sturgeon River—8,000 S3.  
Finlayson's pond-Greek River—5,000 S3.  
Fox River—3,000 S3.  
Hay River—4,000 S3.

Jenkin's pond-Greek River—3,000 S3.  
Leard's pond-Morell River—6,000 S3.  
McAulay's stream-Morell River—1,719 S4.  
McEwan's pond-Savage Harbour—3,000 S3.  
McKinnon stream-Morell River—5,000 S3.  
McLeod's pond-Midgell River—5,000 S3.  
Mooney's pond-Morell River—5,000 S3.  
Morell River—12,000 A3, 35,330 A4.  
Poole's pond-Montague River—3,000 S3.

CARDIGAN PONDS—*Con.**Kings County—Con.*

Quigley's pond, Head of St. Peter Bay—  
3,000 S3.  
Sturgeon River—4,000 S3.

*Prince County—*

Cain's stream-Mill River—9,000 S3.  
Enmore River—4,000 S3.  
Gard's pond-Mill River—6,000 S3.  
Green's stream-Miminegash pond—6,000  
S3.  
McArthur's pond-Foxley River—3,000 S3.  
McWilliam's pond-Pierre Jacques River—  
6,000 S3.  
Myrick's pond-Little Tignish River—3,000  
S3.  
St. Nicholas pond-Sunbury Cove—6,000 S3.  
Sheen's pond-Trout River (Tyne Valley)  
—4,000 S3.  
Sheep River—6,000 S3.  
Tignish River—7,000 S3.

*Queens County—*

Andrews' pond-Hunter River—8,000 S4.  
Ballem's stream-Pownall Bay—3,000 S3.  
Beer's pond-Clyde River—4,000 S3.  
Belle River—10,000 S3.  
Cook's pond-Newton River—4,000 S3.  
Hope River—12,000 S3.  
Lane's brook-Vernon River—3,000 S3.  
McLeod's pond-Belle River—1,500 S2.  
McMillan's pond-Vernon River—4,000 S3.  
McMillan's pond (Wood Islands)—3,000 S4.  
McPherson's pond-Pinette River—3,000 S4.  
McPherson's pond-Flat River—3,000 S4.  
Parson's pond-Glynde River—3,000 S3.  
Ross' pond-Vernon River—6,000 S3.  
Simpson's pond-Hope River—6,000 S3.  
Watt's stream-Winter River—5,000 S4.  
West River—7,000 S3.  
Winter River, north branch—3,000 S3.

## KELLY'S POND HATCHERY

*Kings County—*

Big brook-Fortune River—24,000 S1.  
Big pond (Hermanville)—15,000 S2.  
Crane's pond-Morell River—14,000 Sd.  
Dingwell's stream-Fortune River—10,000  
S2.  
East or Hillsborough River—6,000 S1.  
Finlayson's pond-Greek River—8,000 S1.  
Goose or Cow River—8,000 S1.  
Graystone creek-Boughton River—5,000 S2.  
Hooper's pond-St. Peter's Lake—8,000 S1.  
Larkin's pond-Naufrage River—15,000 S1.  
Leard's pond-Morell River—25,000 Sd.  
MacLeod's pond-Murray River—12,000 S1.  
Marie River—30,000 A1.  
McRae's pond-Montague River—10,000 S1.  
Midgell River—80,000 A1.  
Montague pond (Electric Power)—14,000  
S1.  
Morell River—60,000 Ad, 286,000 A1, 29,-  
600 A2.  
Narrow creek-Boughton River—8,000 S2.  
Naufrage River—6,000 S1.  
Ross' pond-Boughton River—9,000 S2.  
Head of St. Peter Bay—30,000 A1.  
Warren's pond-Head of East or Hills-  
borough River—7,000 S1.

*Prince County—*

Barlow pond-Grand River—4,000 S1.  
Bell's stream-Prevost Cove—4,000 S1.  
Black pond (Horse Head)—8,000 S1.  
Brae River—4,000 S1.  
Carr's stream-Malpeque Bay—4,000 S1.  
Clark's pond-Wilmot River—10,000 S1.  
Conroy's pond (Cape Kildare)—4,000 S1.  
Currie's pond-Lit. Pierre Jacques River—  
8,000 S1.  
Dunk River—20,000 S1.  
Fitzgerald's pond-Grand River—4,000 S1.  
Gordon's pond-Kildare River—8,000 S1.  
Ives' pond-Tryon River—4,000 S2.

Leard's pond-Trout River tributary to  
Lot 10 River—4,000 S1.  
Marchbank's pond-Trout River (Tyne  
Valley)—4,000 S1.  
McAusland's pond-Mill River—8,000 S1.  
McNally's pond-Jacques River—4,000 S1.  
Myer's pond-Miminegash pond—5,000 S1.  
Rix's pond-Kildare River—8,000 S1.  
Round pond (Greenmount)—4,000 S1.  
Waddell's pond-Traverse Cove—4,000 S1.  
Webster's pond-Augustin Cove—4,000 S1.  
Wright Leard's pond-Dunk River—6,000 S2.

*Queens County—*

Bagnall's pond-Hunter River—8,000 S1.  
Black River-Tracadie Bay—6,000 Sd.  
Black River-Covehead Bay—5,000 Sd.  
Clark's stream-East River—10,000 S1.  
Coles' pond-North River—8,000 S2.  
Cousins pond (Seaview)—4,000 S1.  
Craswell's pond-Hunter River—5,000 S1.  
Crooked creek-Wheatley River—4,000 Sd.  
Dixon's pond-De Sable River—12,000 S1.  
Gates' pond-North River—4,000 S1.  
Holms' pond-De Sable River—4,000 S1.  
Glenfinnan River—4,200 S2.  
Johnston River—4,200 S2.  
Leard's pond-Crapaud River—8,000 S2.  
McAulay's stream-Tracadie Bay—5,000 Sd.  
McLean Brothers pond-West River—5,000  
S1.  
Pickett's pond-East River—3,300 S2.  
Rackham's pond-Wheatley River—10,000  
Sd.  
Southport (Kelly's pond) hatchery pond—  
1,540 S2.  
Stordy's pond-Crapaud River—5,000 S2.  
West River—20,000 S1.  
Winter River—10,000 S1.  
Wisner's or Weisner's pond-East River—  
2,500 S1.

## APPENDIX No. 4

## ANNUAL REPORT OF THE ENGINEERING BRANCH

By C. BRUCE, M.E.I.C., *Chief Engineer.*

The scope of work undertaken by the Engineering Branch includes the technical works coming within the purview of the department in the Maritime Provinces, British Columbia and the Northwest Territories, where administration of the fisheries is entirely, or largely, under the federal government. Generally, these works include the removal of obstructions in streams which impede or prevent the ascent of fish to suitable spawning grounds; the design and supervision of construction of fishways, cold storage and other buildings connected with the fisheries and fish cultural establishments, and the administration of oyster cultural work in the Maritime Provinces.

## BUILDING FISHWAYS AND CLEARING RIVERS

Works under this head include: (a) surveys and the preparation of designs for adequate fishway facilities for dams which prevent the ascent of fish to suitable spawning grounds and to overcome natural falls or impassable barriers to their ascent, and (b) the removal of artificial obstructions.

Where dams are privately owned the owners or occupiers are required to install and maintain adequate fishway facilities therein, in conformity with the requirements of the Fisheries Act, but, as those not conversant with the design of fishways are quite unlikely to provide structures that will prove efficient, it has been the policy of the department to require that all fishways shall be built in accordance with designs prepared by the Engineering Branch. This involves a study of each situation and, after the collection of data and the completion of the necessary ground surveys, the design of a fishway to best meet the conditions peculiar to the situation.

The removal of artificial obstructions includes many varieties of work depending on the character and extent of the barriers. Particularly in British Columbia, where the country is mountainous, obstructions are liable to accumulate frequently due to extreme freshets which carry down forest rubbish, and under some conditions may undermine the banks, causing large trees to fall into the water. Many such conditions require immediate action to insure that channels are opened to provide for the ascent of the season's run of fish as otherwise adequate seeding of the spawning grounds would be entirely prevented. Unless obstructions are of a major character, requiring the advice of an engineer, their removal is usually undertaken under the supervision of the local fisheries inspector after the need has been established.

An unusual abundance of rain in the Maritime Provinces throughout the season of 1943 resulted in the streams, generally, having an adequate flow of water and no artificial obstructions to the ascent of fish developed. The Fisheries Research Board, which is undertaking a study of the smelt fishery in the Miramichi River, found that several tributary streams, to which these fish resort for spawning, were so obstructed that the spawning areas were considerably restricted, and on the recommendation of the board, these obstructions were removed.

The works undertaken during the year are classified and reviewed hereunder:—

## NOVA SCOTIA

*Medway River, Queens County.*—The fishway in the Nova Scotia Power Commission's dam, the design for which was made in 1942, was completed by the commission and inspected. Reports show that it is efficient, salmon having ascended since it was installed.



*Nictaux River, Annapolis County.*—A survey was made to obtain information for improving the passage for the ascent of salmon at Wambolt Falls where a small dam, recently built, has made conditions somewhat difficult.

Inspections of fishways were made at Carleton dam on the Tusket River, Milton dam at Yarmouth, Daley and Charlestown dams on the Medway River and Wentzell's dam on the LaHave River.

#### NEW BRUNSWICK

*Tobique River, Victoria County.*—Following extensive repairs to the dam on this river at Plaster Rock, it was found that salmon were not ascending the fishway in the usual numbers. A complete survey of the situation indicated that the fishway was not arranged to provide adequate control of the flow during the different stages of water when salmon are ascending. Plans for the necessary modifications were prepared and submitted to Fraser Companies Limited, owners of the dam, and the necessary work was subsequently completed by the company.

*Kouchibouguac River, Kent County.*—The New Brunswick Electric Power Commission, constructed the fishway, plans of which had previously been supplied by the Engineering Branch in their dam on this river. An inspection showed that while the construction was substantially in accordance with the design, the commission had subsequently dredged the river bed thereby lowering the water to such an extent that fish were unable to enter the fishway. Modification of the design to overcome this was submitted to the commission.

*Aroostook River, Victoria County.*—At the request of the State of Maine fisheries authorities, an engineer inspected the situation at the Aroostook Power Company dam and collaborated with the State engineer, with a view to providing a means for the ascent of salmon past the dam. While the dam is in New Brunswick the river runs almost entirely through Maine and the sport fishermen's organization of that state are prepared to meet the expenditure involved in the hope that salmon may be available for angling in the upper waters of the river.

*Miramichi River, Northumberland County.*—Inspections were made of obstructions to the ascent of smelts on Black River, Vi's, Sutherland, Frenchfort, Hamilton and Black brooks, all tributaries to the Miramichi. Estimates of the cost of removing the obstructions were prepared and several of the streams were opened up, providing increased areas to which smelts may resort for spawning.

#### BRITISH COLUMBIA

Aside from attention given to small obstructions by the fisheries inspectors and guardians, the only work undertaken was on the Atnarko River where the channel was cleaned of obstructions consisting of river drift and trees which had fallen as a result of freshets.

### FISH CULTURAL ESTABLISHMENTS

#### NOVA SCOTIA

*Antigonish Hatchery.*—A survey was made of meadow land bordering on Lake Katrine, which has been damaged by the flowage created by a storage dam built by the department at the foot of the lake to provide additional water for hatchery purposes.

*River Phillip Salmon Pond.*—The property on which this pond is located was acquired during the previous year from the Nova Scotia Light and Power Company. As the boundaries of this property are not definitely defined in the deed it was decided to make a complete survey and establish permanent markers. Work in connection with repairs to the old concrete dam, used in connection with the salmon pond, was continued during the year.

*Inspections.*—Inspections were made at Yarmouth and Middleton hatcheries and at Coldbrook, Mersey and Kejimkujik rearing ponds.



## NEW BRUNSWICK

*Saint John Hatchery.*—Reference was made to the installation of a 14-inch pipe line to provide an additional water supply for rearing pond facilities in the report for 1942. This pipe extended to the ponds from the reservoir supply and it was necessary to provide an intake which was laid during the year. In order to provide for additional water it was decided to install two 14-inch intakes extending out into the reservoir some 60 feet from the shore, with the outer end in a depth of about 12 feet. Wooden pipe was used and it was necessary to provide sinking platforms on which the pipes were assembled and then the whole was sunk with carefully placed ballast. An instrumental survey was made to determine on a location for a system of rearing troughs which it is proposed to install to increase the fry-holding facilities at this establishment.

*Inspections.*—Inspections were made at Grand Falls and Florenceville hatcheries, the latter in connection with repairs to the hatchery building which were effected during the previous year.

## OYSTER CULTURE

The issue of leases of ground for oyster culture in Prince Edward Island and Nova Scotia continued during the year under review.

In Prince Edward Island 90 leases were issued, making a total of 1,216 since leasing commenced in 1932. For various reasons 477 leases have been abandoned by the lessees or cancelled, leaving a total of 739, having a combined area of 1,779.76 acres, in effect. It is quite possible that some of the cancelled leases may be reinstated. In addition to the leases issued, 446 applications were before the department for consideration.

In Nova Scotia 27 leases were issued, making a total of 264 since leasing commenced in 1938. Cancellations and abandonments totalled 37, leaving 227 leases, having a combined area of 526.5 acres, in effect, while 101 applications were being given consideration.

The action on an application for a lease includes investigation of the area it includes in order that the applicant may be advised of the prospects before proceeding further. After the application is approved the area is surveyed and marked and a description for inclusion in the lease is prepared. Various factors may cause delay after an application is received before the lease can be completed. Climatic conditions may be unsuitable for a proper examination of the ground or for making the survey, or the applicant may delay in notifying the department of his intention to proceed following the approval of his application. Such delays account to some extent for the relatively large numbers of incomplete applications.

A total of 95 new areas for leases were surveyed in Prince Edward Island during the year and 45 leased areas, the boundary markers of which had been lost or destroyed, were re-surveyed. In Nova Scotia 26 new surveys and 3 re-surveys were completed.

In addition to the survey of areas for leases, a service which is free of charge to the applicant, the following work was undertaken.

## PRINCE EDWARD ISLAND

All areas in Malpeque Bay, on which lessees are permitted to pick small oysters for stocking their leaseholds, were laid out and marked.

The boundaries of the area owned by the estate of the late G. S. Sharp et al, were located by survey and checked with regard to confliction with adjoining leases.

Triangulation monument No. 37, which had become displaced, was reset and its correct position, with respect to the co-ordinates of the grid lines on which leases are laid out, was established.

#### NOVA SCOTIA

The greater part of the time was spent in making triangulation and stadia surveys for the preparation of correct plans of a portion of the Bras d'Or Lakes shoreline extending from the northerly entrance of Denys Basin to Jamesville and of a large part of Whycomogah Bay.

#### GENERAL

*Lameque Cold Storage.*—Following the decision of the Lameque Fishermen's Cooperative to proceed with the erection of a bait freezer and cold storage plant, complete plans and specifications for the building were prepared and furnished to them.

*North Rustico Cold Storage.*—At the request of the fishermen's organization at North Rustico, P.E.I., a design of a building for a small cold storage plant was prepared for them.

*Grand Etang Cold Storage.*—The site on which the Grand Etang Fishermen's Association proposed to erect a cold storage plant and bait freezer was examined and surveyed. Some cold storage machinery in an old plant at Port Hood island was examined to determine if it might be suitable for the plant which the Grand Etang association proposed to build. It proved to be unsuitable.

*Gaspe Fisheries Experimental Station.*—Following the decision of the Fisheries Research Board to rebuild the Gaspe Experimental Station, the board requested that the construction be undertaken by the department, including the preparation of plans and specifications. The main building measures 35 feet by 60 feet, two storey and roof, with an ell measuring 13 feet by 43 feet for housing the machinery and heating plant. The designs provide for a brick faced building with reinforced concrete floor slabs carried on structural steel joists.

*Inspections.*—General inspections were made of waters in Prince Edward Island, in which there is interest in improving conditions for trout. The streams inspected included Andrews, Jones, Annandale and Nicholson's ponds, Montague River and Fullerton's Marsh brook.

An inspection was made of a cold storage, recently opened at Chamecook, N.B., to obtain information regarding the facilities of the plant.

#### APPENDIX No. 5

### REPORT ON OYSTER CULTURE WORK UNDER THE DEPARTMENT OF FISHERIES FOR THE YEAR 1943-44

By C. J. KERSWILL, *Fisheries Research Board of Canada*

Oyster culture work has been carried on by the Department of Fisheries in Prince Edward Island since 1928 and in Nova Scotia since 1934. The Dominion Government obtained jurisdiction over the oyster areas of the two provinces in 1928 and 1936, respectively, and policies of leasing grounds for oyster farming were then developed. In New Brunswick only the Shediac area was transferred to Dominion jurisdiction in 1931 and work was carried on there for two years. Owing to uncertainties regarding public health control development was postponed until 1940 when investigations were resumed. In the past three years the New Brunswick Government has been assisted with the administration of leasing and with educational work among lessees in other areas, particularly in the vicinities of Shippigan and the Miramichi River.

The department co-operates with the Fisheries Research Board in experiments and investigations designed to develop and demonstrate methods of oyster culture suited to the various districts where grounds may be leased. Headquarters are at Ellerslie in the important Malpeque Bay area, where the Prince Edward Island Biological Station is located near the department's areas which have been reserved for oyster farming. While the methods developed here have quite general application, there are special problems in other places requiring local investigation. Thus experimental farms are also operated by the department at Orangedale in the Bras d'Or Lakes area and Malagash on Northumberland Strait. Also, a small demonstration farm is now established at Shediac, N.B., and similar work was started this year at Shippigan, N.B., on a small scale. The experimental farms are not only necessary for the development and demonstration to lessees of oyster culture methods but they are also of service in supplying, at cost price, oysters and spat suitable for stocking leases.

Keen interest in oyster farming has been maintained since the outbreak of war but an acute labour shortage this year caused a great reduction in the work by lessees, especially in Prince Edward Island. Since many lessees are forced to reduce their activities it is important that the work of the department continue as normally as possible. This will help to maintain confidence and interest in oyster farming and facilitate resumption of the work after the war.

#### A.—PRINCE EDWARD ISLAND

*Malpeque-Cascumpeque Region.*—A mortality of oysters commencing in 1915 left this region almost devoid of oysters which had been abundant and noted for their fine quality. By an agreement with the Provincial Government in 1928 the Dominion Government obtained jurisdiction over all the oyster areas of the province. With the object of re-establishing the industry, preliminary investigations were begun at Ellerslie that year and scientific research on methods of oyster cultivation in 1929. Leasing of grounds for oyster culture began in 1931 and the related administrative work including interviewing applicants for leases, examining and surveying areas and making arrangements for lessees to stock their leases has been done at the Prince Edward Island Biological Station.

This year the development work done on leased areas and the quantity of oysters marketed were much lower than in the past few years, as shown in Table I. This can be explained readily by an acute lack of personnel caused by many lessees being on active service and many labourers who formerly assisted with oyster farming having entered war work. Fortunately, the development work, although small, was distributed over most leased areas. Since few oysters were marketed the leases generally are becoming better stocked for future fishing, not many having yet approached the fully-stocked stage. The department assisted many lessees who could not put out spat collectors themselves in 1942 by supplying separated spat at cost price. Definite progress has been made towards establishing a profitable oyster industry in the Malpeque-Cascumpeque region. Development was slow until 1935 when rapid expansion occurred. Since oyster farming cannot be brought to a profitable stage in less than about five years, total expenditure exceeded receipts for some time. Since 1939 an increasing number of oyster farmers who commenced work in the early years have begun to make a profit. In 1942 total receipts exceeded total expenditure by over \$15,000 but this year by only about \$2,000, the reduction being caused by the small quantity of oysters marketed. With further development of more economical methods, it may be expected that oyster farming can be placed on a more and more profitable basis.

*Regions Affected by More Recent Mortalities.*—The public fishery in Enmore and Percival rivers was destroyed by a mortality commencing in 1933. Similar



destruction of the oyster fishery of the Hillsborough River, some inlets east of Charlottetown, and neighbouring north shore bays began in 1935. Evidence has been obtained that all these mortalities were caused by the same disease as destroyed the oysters in the Malpeque-Cascumpeque region in 1915 and succeeding years.

Experiments have shown that the oysters now present in Malpeque Bay which were bred from survivors of the disease are resistant to it, whereas small oysters being produced in the regions recently affected are still susceptible. The department therefore offers for sale to holders of leases in affected areas, Malpeque stock produced on its reserve in Bideford River. As a result, interest in oyster farming as a means of re-establishing the industry in these areas has increased since 1941 and many new leases have been issued recently, especially in the Alexandra and Pownal Bay areas and in the Enmore-Percival district. This year 277 gallons of separated spat and 89 barrels of small oysters were sold to stock such leases.

*Bedeque Bay.*—Summerside Harbour has large public fishing beds but it is closed to direct marketing because of pollution and oysters must be re-laid for one month to adjacent approved coves for purification before marketing. Several holders of leases in Salutation, Sedgewick and Sunbury coves now purchase large quantities of oysters from public fishermen during the summer re-laying period, transferring them to their leases and marketing them in the fall. This fishing has improved conditions for natural spat collection on the Summerside beds and the area can support a large fishery without danger of depletion. In 1943, 2,300 barrels were re-laid as compared to 2,137 in 1942 and 1,335 in 1941. Of these, 1,754 barrels were re-fished and marketed as compared with 1,975 and 1,065 in the two previous years. The methods of handling and marketing the re-laid oysters require improvement. In some cases the oysters have been replanted too thickly, causing poor condition before marketing. The lessees were given advice this year based upon re-laying experiments of the department and such assistance should be continued.

*Provision of Planting Stock.*—In the Malpeque-Cascumpeque, Bedeque Bay, Enmore-Percival and other regions permits are issued to lessees to pick oysters in the shore zone for stocking their leases. The period of picking is limited to several weeks in the summer when tides are suitable and the operations can be supervised with least risk of illegal marketing. Many well-shaped oysters are transferred to leases in deeper water, thus saving them from winter killing. This year about 475 barrels were picked and replanted.

*Marketing of Shucked Meats.*—Owing to an embargo, during the war, on importation of oysters from the United States, the value of shucked oyster meats on the Canadian market has multiplied about three times. This has encouraged several local dealers to shuck oysters of low shell grade and this year about 520 barrels were opened and marketed successfully in iced containers. Since the embargo on United States shucked oysters was lifted during the winter it is doubtful that the operations will be profitable on Prince Edward Island next year.

## B—NOVA SCOTIA

The oyster areas of Nova Scotia came under federal jurisdiction in 1936, intensive investigations commenced that year and ground was offered for lease in 1937. There are two oyster producing areas—the Bras d'Or Lakes and the Northumberland Strait coast—having problems and conditions different from one another and from the Malpeque-Cascumpeque region of Prince Edward Island. Oyster culture methods suited to the special local conditions are necessary, therefore experimental stations were established in 1936 at Orangedale,



in the Bras d'Or Lakes area, and in 1937 at Malagash on Northumberland Strait. Development of private oyster areas had just commenced at the outbreak of war and it has been retarded since. Experiments by the department in spat collection and rearing and in predator control are providing information which will be useful in the future development of the industry. The development of oyster farming in the two regions from 1939 to 1943 is summarized in Table II.

#### BRAS D'OR LAKES

Here the salinity of the water is low and the oysters have weak shells, thin meats and fresh flavour, hence the value of the product is relatively low when marketed in the shell. Natural spat production is good and satisfactory methods of artificial spat collection have been developed. Therefore, the greatest need is to develop the cheapest possible methods of production and to improve the marketing.

*Marketing of Shucked Oysters.*—Since Bras d'Or Lakes oysters have many natural disadvantages for marketing in the shell, an attempt has been made to market shucked meats in bulk. The first attempt was made in 1939 at Orangedale through the co-operation of the Department of Fisheries and the Nova Scotia Marketing Board. Although at first the yield of oyster meats per barrel was low and the venture appeared to be unprofitable, repetitions of the experiment have given better returns each year, as shown in previous annual reports.

In 1942, 809 barrels were shucked, with an average yield of 1.5 American gallons per barrel and the average price received was \$5.30 per gallon. This year 850 barrels produced 1,106 American gallons of meats or an average of 1.3 gallons per barrel and an average price of \$6.60 per gallon was received. By marketing as shucked meats, oysters which would sell in the shell for \$2 or \$3 per barrel are now worth from \$6 to \$7 per barrel.

Since the high price of shucked oysters is largely the result of the wartime embargo on importation from the United States it cannot be expected to last. Lower returns are expected next year because the embargo was lifted late this winter. However, the quality of Bras d'Or Lakes shucked oysters compares favourably with the American product and the present price of the latter is more than twice the pre-war value. Possibly Bras d'Or Lakes oysters can still be marketed most profitably in the form of shucked meats.

*Development of Leased Areas.*—The increase in the number of areas under cultivation, the expenditure in work and materials, and the quantity of oysters marketed from leased areas from 1939 to 1943 are shown in Table II. Although the number of leases has more than doubled during the period, there has not been a corresponding increase in the total development work. This is probably because of an increasing desire by those at home to take out leases which can be turned over to relatives returning after the war. The lack of help, however, prevents much work on such areas.

The decrease this year in the quantity of oysters planted on leases from 205 barrels in 1942-43 to 96 barrels is explained by lack of help rather than scarcity of stock. Most of the oysters so planted are picked by hand under permit in shallow water along the shores and such stock was quite abundant but left unpicked. Permission by the department of this picking is of great assistance to lessees where inexpensive stocking methods are required.

#### NORTHUMBERLAND STRAIT

The principal areas where oyster culture methods can be operated occur in Tatamagouche Bay, Caribou Harbour, Pictou Harbour and Merigomish Harbour. Conditions are generally different from the Bras d'Or Lakes and the north shore of Prince Edward Island because of the much greater range of tides.

Owing to higher salinities, better quality oysters can be produced than in the Bras d'Or Lakes but production is more difficult because of the extensive intertidal flats which have special problems of spat collection, growth and wintering. These problems have now been largely solved at Malagash and the results of the investigations, with further modifications, will be useful in developing oyster farming elsewhere.

*Development of Leased Areas.*—Table II summarizes the development of private oyster farming along the Northumberland Strait from 1939 to 1943 and comparison may be made there with development in the Bras d'Or Lakes. Although the acreage under cultivation has been less every year than in the latter area, the quantity of oysters marketed as well as the expenditure in work and materials has exceeded that in the Bras d'Or Lakes since 1941. This is largely the result of the work of a few enterprising lessees in Merigomish Harbour and of increasing interest in re-laying oysters from polluted parts of Pictou Harbour to uncontaminated leases in Middle River. In 1943, 153 barrels were re-layed and 127 fished again and marketed. Continued progress is being made on leaves in Tatamagouche Bay and Caribou Harbour, and lessees throughout the whole area are being encouraged by the relatively high market value of their product.

### C.—NEW BRUNSWICK

*Shediac Area.*—The Dominion Government has had jurisdiction over the oyster areas of Shediac Bay since 1931 but no other transfers have yet been made. Investigations at Shediac were postponed in 1933 owing to the uncertainty of the public health situation but they were resumed in 1940 and in 1942 a small experimental farm was established there. The 1940-1942 investigations have shown that the chief problem at Shediac is the lack of a dependable natural spat production. Therefore, transfers of spat collected in Nova Scotia have been made. Separated spat produced on the department's areas at Orangedale and Malagash, N.S., survived and grew well both on floating trays in Scoudouc River and on the bottom of a reserved area in the bay. It is hoped that from further investigations, practical methods of oyster farming can be developed to assist future lessees.

*Other Areas.*—Elsewhere there has been a recent demand for increased work in the province, especially in Gloucester and Northumberland counties.

In 1942 the Provincial Government was assisted by the department in the Shippigan vicinity with the examination of areas to assess their suitability for oyster culture and with educational work. As at Shediac, there is not a dependable natural spat production at Shippigan. This year an investigator was employed by the Provincial Government to begin experiments there, chiefly in artificial spat collection and rearing under the direction of the department and the Fisheries Research Board. The results were promising and it is planned to extend the scope of the investigations in 1944.

In 1943 an intensive survey of the oyster areas of the Miramichi River was made. Examination of the oyster populations on numerous beds in the public fishing areas showed that some could be opened to supervised fishing by lessees for stocking their areas, since environmental conditions are such that few oysters ever reach marketable size and the stock is of poor quality. If such a policy can be put into practice, holders of provincial leases in the Miramichi River would be assisted with their most difficult problem—the shortage of seed oysters for stocking their leases. The total production of high-quality oysters in the region would also be increased.

Preliminary investigations in Tracadie Lagoon, where there are several new provincial leases, showed the presence of rapidly growing native oysters of the highest quality, but irregular spat production.

*The Need for Oyster Farming.*—Increased production and improvement of quality would likely result from oyster farming here as elsewhere. The lack of dependable spat production in so many areas having otherwise excellent conditions for oysters requires attention. Educational work among lessees is necessary and the department now distributes its oyster farming circulars to New Brunswick lessees in French as well as English.

#### D.—GENERAL

##### REVENUE

Revenue from the department's oyster culture work is obtained from such sources as the sale of oyster spat and medium-sized oysters to lessees for stocking purposes, the sale of marketable oysters by tender from the department's reserved areas, and rentals and royalties on leases. Such revenue goes to consolidated revenue and is not credited to the vote. It serves, however, to reduce the actual net cost of the work to the government considerably below the amount expended under the appropriation. The appropriation in 1943-44, exclusive of cost of living bonus, was approximately \$23,500. Through economy the expenditure was limited to \$18,900 and the revenue reduced the net cost to about \$13,700.

The revenue for the past six years is summarized in the accompanying table. As the quantity of marketable oysters on the department's beds increased, the revenue became steadily greater until 1939-40. Some reduction occurred in 1940-41 owing to somewhat lower production, but greater production and higher market prices in 1941-42 were largely responsible for an increase in revenue to \$9,900—the maximum thus far. In 1942-43 the demand for the lowest or "standard" grade oysters was much less than heretofore and fewer were fished for sale; more small oysters were sold at cost (\$3 per barrel) for stocking areas in outlying districts, however, and such assistance to oyster farmers is the primary function of the department's experimental areas. Last year revenue from the sale of marketable oysters was much reduced owing to the impossibility of obtaining enough fishermen and graders in the fall, an average crew of seven having to attempt the work previously done by fourteen. Also, weather during the fishing season was exceptionally unfavourable and often prevented the fishermen from obtaining a good catch. Fortunately, the results of the spring and summer work—spat threshing and fishing of small oysters for sale to lessees—were good, since the normal crew of six labourers were usually available. Although relatively little revenue is obtained from this source, all orders from lessees who required separated spat and oysters for stocking their areas were supplied. Although, owing to labour shortage, similar reductions in revenue are to be expected for the duration of the war, it is believed that when sufficient help is again available, the revenue, including rents and royalties, will continue its long-term tendency to increase.

##### RESULTS OF INVESTIGATIONS AND EXPERIMENTS

Details of the investigations are presented in bulletins and circulars of the Fisheries Research Board and only the highlights are mentioned here.

Predictions of the settlement of oyster spat were again made in the Malpeque-Cascumpeque, Enmore-Percival, Orangedale and Malagash regions, and for the first time in the Shippigan district. Although weather conditions everywhere were unfavourable for early settlement and rapid growth of spat, a plentiful catch was obtained both by the department and by lessees putting out their own collectors. It is expected that the department will have a sufficient quantity of separated spat to supply all orders by lessees in the spring of 1944.



In connection with the spat prediction work, larval stages of the soft-shell clam (*Mya arenaria*) and of the razor clam (*Ensis directus*) were identified. Characteristics of the spat of three other bivalves were determined and it is hoped to identify the adults next year.

At Malagash, spat on cardboard collectors were wintered without loss in a salt marsh by retaining salt water by means of a dam to a depth of four to five feet in the lower part of a small tidal creek. This overcame the previous difficulty of holding spat over winter, and makes possible the production and handling of much larger quantities of spat should the demand by lessees increase. The great exposure to winds and currents on flats at Malagash was found to prevent the successful use of wooden frames in place of wire netting to enclose bundles of concrete-coated spat collectors.

Little is known of the causes of winter mortality of oysters on tidal flats. Experiments at St. Andrews, N.B., indicated that oysters can withstand temperature and salinity changes to be expected under the ice in spring, but confirmed earlier results that they are damaged by mechanical shock when frozen.

Definite evidence is lacking that Bedeque Bay oysters ever suffered from the oyster disease. Small lots of oysters were transferred from Summerside Harbour to Malpeque Bay and Enmore River on May 6th, 1943, and they have survived and grown well, suggesting that they are resistant. Next year the experiment is to be repeated with small spat which will be collected in Bedeque Bay. The results may have practical significance in allowing future relaying from Summerside Harbour to Malpeque Bay—a practice prohibited now because of the risk of mortality.

Further experiments on the protection of wood against shipworms (*Teredo*) indicated the value of a commercial paint "Ace of Spades" which is only slightly more expensive than the tar-copper-oleate mixture and gave somewhat better protection and better waterproofing to oyster-culture equipment.

A study of the growth rate of the bar clam which has been used increasingly for canning showed that marketable size of 2½ inches is reached in 3 to 4 years. Thus, stocks are less likely to be depleted by fishing and likely to recover more rapidly than in the case of the quahaug which requires twice as long to reach marketable size.

Experiments on oyster growth indicated that the growth rate varies directly with the amount of water circulation over the beds or trays and is greatly reduced by the proximity of eel grass. The total growth of oysters on the bottom in inshore areas was greater just above low water mark than at either high or low levels. Growth on fixed trays was fastest at mid-depth.

The investigations in the Shediac Bay, Shippigan and Miramichi River areas of New Brunswick have been mentioned above. It is hoped that the common problem of spat production can be solved by further investigations and a source of seed oysters made available to lessees.

The exploration of oyster areas preliminary to the leasing of grounds and the development of suitable administrative problems occupies much of the time of the scientific staff. This work was continued in the three Maritime Provinces.

#### GRADING AND INSPECTION

Since the introduction in 1941 of the new oyster grades, "Fancy", "Choice", "Standard" and "Substandard", and new requirements for handling and packing oysters, there has been great improvement in shipments leaving the coast.

Immediately after the regulations were passed a conference of fishery officers was held at which careful instruction in grading and packing oysters was given. Later, an inspector experienced in grading visited other inspectors throughout



the Maritime Provinces giving further instruction. Each winter an inspector has checked and reported upon oyster shipments arriving at Montreal and has interviewed dealers. Thus it has been possible to judge the effectiveness of the inspection in various regions and to know when further changes in the regulations are necessary.

In September, 1943, a two-day conference of fishery officers from all districts where oysters are handled was held at Ellerslie. Various grades of oysters from several regions were examined, then used for practice in grading by each inspector. Problems confronting inspectors in checking the packing and grading of oysters were discussed and several recommendations to clarify and improve the present regulations were made and forwarded to the department. Such meetings must be held regularly in order that oysters from different regions can be graded uniformly and to discuss necessary changes in the regulations.

Dealers of oysters at Montreal and other centres have expressed satisfaction with the grading and inspection system. They now recognize the government grades as giving a true indication of the quality to be expected in a container. To ensure sound expansion of marketing as the production of oysters is further increased by oyster farming, close attention must be given to the grading and packing of the product.

TABLE I.—OYSTER FARMING IN THE MALPEQUE-CASCUMPEQUE REGION, 1935-43

	1935	1940	1941	1942	1943	*Total 1935-1943
1. Barrels of oysters planted.....	1,303	5,337	3,392	4,580	2,523	35,267
2. Concrete-coated spat collectors used (egg-crate fillers).....	3,350	82,500	51,824	28,610	18,480	423,664
3. Barrels of oysters sold.....	979	3,251	3,187	4,538	2,345	24,016
4. Receipts from sale of oysters (estimated at \$9 per bbl. 1941, 1942, 1943; \$8 previously).....	7,832	\$ 26,008	\$ 28,683	\$ 40,842	\$ 21,105	\$ 202,198
5. Wages paid by oyster farmers.....	\$ 2,137	\$ 12,485	\$ 11,533	\$ 8,538	\$ 8,268	\$ 95,881
6. Money spent for materials used.....	\$ 1,665	\$ 8,914	\$ 10,696	\$ 10,155	\$ 6,035	\$ 107,627
7. Total cash expenditure.....	\$ 3,802	\$ 21,399	\$ 22,229	\$ 18,693	\$ 14,303	\$ 203,508
8. Days' work by lessees or unpaid assistants.....	1,126	5,085	4,326	4,077	2,696	37,268
9. Value of (8) at \$1.75 per day.....	\$ 1,971	\$ 8,899	\$ 7,570	\$ 7,134	\$ 4,718	\$ 65,220
10. Total expenditure.....	\$ 5,773	\$ 30,298	\$ 29,799	\$ 25,827	\$ 19,021	\$ 268,728
11. Excess of total expenditure over receipts.....	—\$2,059	\$ 4,290	\$ 1,116	—\$15,015	—\$2,084	\$ 66,530
12. Excess of cash expenditure over receipts.....	—\$4,030	—\$4,609	—\$6,454	—\$22,149	—\$6,802	\$ 1,310

\* Includes 1936, 1937, 1938, 1939 figures which are not shown in detail.

TABLE II.—OYSTER FARMING IN NOVA SCOTIA, 1939 TO 1943

	1939-40		1940-41		1941-42		1942-43		1943-44		Total 1939-43	
	Bras d'Or	North Strait	Bras d'Or	North Strait	Bras d'Or	North Strait	Bras d'Or	North Strait	Bras d'Or	North Strait	Bras d'Or	North Strait
Number of areas under cultivation.....	7	27	103	28	131	55	137	62	161	66	161	66
Approximate total area....	151	95	221	91	255	188	244	204	317	209	317	209
Barrels of oysters planted....	130	313	218	226	163	772	205	535	96	257	812	2,103
Barrels of oysters sold....	413	294	393	265	418	676	450	596	473	652	2,147	2,483
Wages paid for develop- ment.....	\$ 44	\$ 60	\$ 18	\$ 110	\$ 17	\$ 927	\$ 24	\$ 1,171	\$ .....\$ 2,281	\$ 103	\$ 4,549	
Money spent for materials....	\$ 479	\$ 193	\$ 276	\$ 123	\$ 482	\$ 723	\$ 655	\$ 2,016	\$ 473	\$ 652	\$ 2,365	\$ 3,707
Days' work by lessee.....	388	515	401	379	418	1,007	515	409	498	586	2,220	2,896
Value of time by lessee at \$1.75 per day.....	\$ 678	\$ 902	\$ 702	\$ 663	\$ 731	\$ 1,763	\$ 900	\$ 659	\$ 872	\$ 1,025	\$ 3,883	\$ 5,012
Total value work and materials.....	\$ 1,201	\$ 1,155	\$ 1,096	\$ 896	\$ 1,230	\$ 3,413	\$ 1,578	\$ 3,486	\$ 1,345	\$ 4,057	\$ 6,450	\$ 13,007

TABLE III.—REVENUE FROM DEPARTMENT'S OPERATIONS FOR YEARS, 1938-39, 1939-40, 1940-41, 1941-42, 1942-43, 1943-44, UP TO MARCH 31, 1944

	1943-44	1942-43	1941-42	1940-41	1939-40	1938-39
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Sale of cardboard collectors bearing spat.					367 20	505 20
Sale of wire containers for spat collectors.					3 10	36 20
Sale of 17 bundles collectors with spat @ \$0.72.					12 75	
Sale of separated spat—490½ gals. @ \$0.70	343 35			235 40		
Sale of “—150 “ @ \$0.65	97 50		154 60			
Threshing spat from 50 collectors at 6¢ each.	3 00			20 08		
Threshing spat from 1860 collectors at 1½¢ each.			27 90			
Sale of 138½ bbls. small oysters for stocking areas at \$3.00 per bbl.	415 50	579 00	400 50	78 00	333 00	579 00
Sale of marketable oysters (average price \$9.74); (\$8.72 in 1941-42)						
48½ bbls. Substandard @ \$6.00 (\$8.10 in 1941)...	291 00		607 50			
70½ “ Standard @ \$ 8.75, \$8.76.	617 33	2,915 05	4,471 20	2,908 80	2,202 60	1,510 00
28 “ Choice “ \$12.00.	336 00	842 30	742 41	917 70	2,287 60	1,196 00
30½ “ Fancy “ \$14.55.	441 35	747 30	822 12	1,377 80	1,729 18	1,293 78
Sale of 13 bbls. oysters from St. Ann bay, Nova Scotia.						57 32
Sale of 18 bbls. oysters from Malagash, N.S. @ \$5.69.			100 80			
Sale of 3 bbl. 3 pks. oysters from Buctouche @ \$5; \$6 in 1940.			16 50	216 00		
Sale of 68 gals. of spat from Bras d'Or lakes @ \$0.50.			34 00			
Logs purchased from Department by H. V. Carr.			15 00			
Fees for resurveys of boundaries of leases		5 00	4 00		27 50	21 50
Royalty on oysters taken from leases and rentals on leases.	2,667 88	2,494 14	2,503 69	2,308 50	2,044 01	1,758 27
	\$5,212 91	\$7,582 79	\$9,900 22	\$8,062 28	\$9,007 14	\$6,957 27

## APPENDIX No. 6

**REPORT ON THE WORK OF THE CANNED FISH INSPECTION  
LABORATORY, VANCOUVER, BRITISH COLUMBIA  
FOR THE YEAR 1943-44**

*By F. CHARNLEY, Chief Chemist*

The following report summarizes the work of the Canned Fish Inspection Laboratory during 1943-44 with particular reference to the various subjects, which, in addition to the routine examinations, have engaged the attention of the laboratory during the past year.

(1) During the past year the tolerances for freshness of canned herring and canned salmon reported in the 1942-43 annual report have been applied as shown in that report, with two minor alterations. For codes falling into the "Grade B" and "Below Grade B" categories, the size of resample drawn from each suspected code has been increased from 6 to 12 tins. Secondly, the lower limit of the carbon dioxide value for Grade B canned salmon has been made slightly more stringent by shifting this limit from 0.180 to 0.170.

(2) Analyses carried out by the laboratory during the past year have shown that there is a linear relation between the average carbon dioxide value of the muscle tissue and the average acid value of the oil of canned salmon, thus further reinforcing these two measures of spoilage and relating these tests with the work on the hydrolysis of the oil of canned salmon carried out by Brocklesby

and the investigation carried out by Lyubin and Lebedeva on the measurement of spoilage of meat.

(3) Further work which has been carried out by the laboratory during the past season has confirmed previous results showing that there is a linear relation between the average carbon dioxide value of canned salmon and the average examiner's rating based on organoleptic evidence.

(4) Work recently carried out by the laboratory on experimental samples of canned herring in collaboration with the laboratory of a large company operating on this coast has shown that the acid value of the oil of canned herring increases rapidly with the time of storage of the raw fish outdoors.

(5) The results of this work have also shown that the carbon dioxide value of the drained tissue of canned herring, where the cans are not pre-cooked and exhausted, increases rapidly with the time of storage of the raw fish outdoors.

(6) The results of this investigation have also shown that the pH of the aqueous liquid of canned herring, packed without the addition of tomato sauce under the above conditions, increases with the time of storage of the raw fish outdoors, that is, increases as spoilage proceeds.

(7) In addition, the results of this work have shown that the volatile acids, or carbon dioxide value, of the raw, ground muscle tissue of the herring, determined in a large diffusion apparatus, increases rapidly with time of storage of the raw fish outdoors, that is, as spoilage in the raw fish increases.

(8) The results of this work have further shown that, over the range in which spoilage increases and begins to be pronounced, the average volatile acids of the raw fish is directly proportional to, or linearly related to, the average acid value of the oil of the canned samples.

(9) Finally, the results of this work have shown that, over the range in which spoilage commences and begins to be pronounced, the average carbon dioxide value of the cooked tissue is directly proportional to, or linearly related to, the average acid value of the oil of the canned samples. These results together with the results of previous work have thus made available two relatively simple and accurate chemical tests for determining the degree of incipient decomposition in herring tissue, namely, the volatile acids value for the raw ground tissue, and the acid value of the oil for the canned product.

(10) In addition to the above, other work carried out at the laboratory during the past year suggests that the acid value of the oil of canned herring parallels certain properties of the proteins in the aqueous liquid apparently arising from the degradation of the protein material resulting from postmortem spoilage in the fish.

(11) The incubation tests introduced by the laboratory late in 1942 have been continued during the past season, but have failed to reveal any further evidence of underprocessing or lack of sterility in canned salmon and canned herring packed in British Columbia. The undercooked and non-sterile parcel encountered in 1942 thus probably represents an isolated occurrence of this defect.

(12) The preliminary work on the problem of the differences, if any, in quality of pink and sockeye salmon caught in the Gulf of Georgia as compared with the corresponding species caught in the Fraser River and the immediate approaches thereto is not yet complete, but tabulation and study of the 1939 data on file at the laboratory have so far failed to reveal any significant differences in quality of salmon caught in the two areas, when fish taken at the same time in the two areas and packed at the same cannery are compared. It is expected that a full report of this preliminary investigation will be ready for the consideration of the department in the near future.

(13) Lastly, it should be mentioned that three large companies in British Columbia are now co-operating with the department's inspection laboratory and



rendering valuable assistance to the department by applying the tests on raw and canned fish that have been made available through the work of the laboratory. One of these companies has now had a year's experience testing herring delivered for canning purposes, with the result that during the past year every parcel of canned herring submitted for inspection by this company has been found to be "Grade A," and in fact excellent in quality as regards freshness. Another of these companies began applying these tests in December, 1943, with similar encouraging results, since all parcels of canned herring submitted by this company during the past season to date have been found by the laboratory to be "Grade A" with respect to freshness. The writer is therefore convinced that, if other salmon and herring canners can be induced to follow the example set by these progressive companies, the losses to the industry resulting from failure to pack a product that is "Grade A" as regards freshness, can be entirely eliminated within a few years.

# APPENDIX No. 7

## REPORT OF THE ATLANTIC CANNED FISH INSPECTION LABORATORY HALIFAX, N.S., FOR THE YEAR 1943-1944

By ERNEST HESS, Ph.D.

The work of the laboratory can again be divided into five sections:—

### CANNED LOBSTER GRADING

Due to a ready market for ungraded goods and a single price ceiling, little demand for grading existed during the year. Only one grading permit was issued by the Department and only one lot of 50 cases of 6-ounce cans was submitted for grading. They were found to be of "Fancy Quality."

### CANNED HERRING INSPECTION

A total of 56,616 cases of canned herring and sardines for shipment to the British Ministry of Food have been inspected, namely:—

Type of Can	In Tomato Sauce	In Vegetable Oil
3½ oz. rectangular "Dingley's".....	2,471	20,000
7 oz. half-pound ovals.....	4,700	2,100
13 oz. pound ovals.....	26,019	1,326

Of this total 97.7 per cent were found Grade "A" and 2.3 per cent Grade "B."

### EXAMINATION OF UNDERWEIGHT SAMPLES

Five samples of canned lobster submitted by fishery inspectors from lots under seizure for being found underweight were checked and confirmed.

Among the routine samples of canned fish and shellfish examined at the laboratory (see next section) a considerable proportion of the lobster (Fall pack), clam and mussel samples were found to be underweight, namely:—

Product	Underweight Samples Submitted by Fisheries Inspectors	Routine Samples Examined at Laboratory		
		Total No. of lots	Found underweight	
			No.	%
Lobster.....	5	60	16	27
Clams.....	0	37	7	19
Mussels.....	0	33	7	21
Mackerel.....	0	67	5	7
Chicken Haddie.....	0	322	21	6



The high price of canned lobster apparently tempted some canners to allow too small a margin for shrinkage of the meat during processing, while in the case of clams and mussels some newcomers in the industry did not realize that in this product also considerable shrinkage takes place during processing. A circular on this subject is ready for distribution to all shellfish canners. More frequent weight tests of all canned fish and particularly shellfish at the canneries by the fisheries inspectors seem indicated.

#### ROUTINE EXAMINATION OF ALL CANNED FISH PRODUCTS

In view of the great increase in the number of canneries beginning to pack various fish products, particularly "Chicken Haddie," herring and mackerel, a routine survey of the quality of these products was undertaken. Periodical withdrawal of samples from all canneries through the local fishery inspectors was arranged. Samples consisted of three cans usually, but larger samples were withdrawn when the quality was not satisfactory. The number of samples per cannery varied from 1 to 31, depending upon the length of the packing season and the quality of the goods.

The following table summarizes the scope and result of this survey:—

Product	Number Canneries in Survey	Number Samples Examined	Quality		
			Good	Fair	Poor
			%	%	%
Lobster (Fall Pack).....	28	60	93*	7	.....
Chicken Haddie.....	65	322	50	36	14
Herring.....	34	54	37	42	21
Mackerel.....	43	67	55	29	16
Clams.....	16	37	44	56	.....
Mussels.....	13	33	24	26	50

\*Fancy

In connection with the examination of these samples, some 110 visits were made to fish canneries during the season, investigating the causes responsible for low quality in some of the Chicken Haddie, herring and mackerel packs. The main factors found were low quality of raw material due to carelessness of fishermen and packers, long distance trucking, lack of ice in transporting and holding fish. Only in the case of herring (lack of pre-cooking or drying of the raw material) and mussels (careless shucking and washing) was poor canning technique responsible for poor quality of canned goods. Insufficient vacuum, however, was a common fault of most canned fishery products.

#### EXPERIMENTAL CANNING AND RESEARCH

Summary accounts of investigations have been reported in the annual report for 1943 of the Atlantic Fisheries Experimental Station at which laboratories these investigations were carried out by the staff of the Canned Fish Inspection Laboratory.

These cover work on the factors affecting shrinkage of hake in cooking, on increase in trimethylamine in Chicken Haddie during processing and storage, on factors affecting the texture of canned herring and mackerel, on the use of chemical and organoleptic tests to determine the quality of fresh and canned mackerel, and on the improvement of the colour of canned Atlantic salmon.

## APPENDIX No. 8

## STATEMENT OF REVENUE RECEIVED DURING THE FISCAL YEAR 1943-44

Class	Total		General Account		Nova Scotia		P.E.I.		New Brunswick		Quebec		Hudson Bay		British Columbia		Yukon	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
<i>Privileges, Licences and Permits—</i>																		
Fishing Licences.....	42,690	00			4,767	75	896	75	9,560	50			1	00	26,959	00	505	00
Modus Vivendi.....	259	00			14	00									245	00		
Oyster Leases.....	2,924	87			495	99	2,428	88										
Trawler Licences.....	1,583	33			1,583	33												
Rentals.....	5	00													5	00		
<i>Proceeds from Sales—</i>																		
Pelagic Sealing (Sales of skins).....	219,260	71	219,260	71														
Sales of fish.....	474	30					50	00	424	30								
Sales of Oysters.....	2,562	22					2,562	22										
Sundry Sales.....	857	54	162	42	320	50			260	90	91	20			22	52		
<i>Services and Service Fees—</i>																		
Canned Salmon Inspection Fees.....	6,295	57													6,295	57		
Canned Herring Inspection Fees.....	6,213	29													6,213	29		
Canned Lobster Inspection Fees.....	5	00			5	00												
Miscellaneous Services.....	3	00					3	00										
<i>Premiums, Discount and Exchange.....</i>	1	77			1	22	0	25							0	30		
<i>Refunds of Previous Years' Expenditure.....</i>	1,661	67	459	92	714	71	1	30	249	25	91	37			145	12		
<i>Miscellaneous—</i>																		
Fines and Forfeitures.....	20,618	14			445	50	545	60	1,419	65					18,207	39		
Miscellaneous.....	5	25							5	25								
Total.....	305,420	66	219,883	05	8,348	00	6,488	00	11,919	85	182	57	1	00	58,093	19	505	00

Certified Correct,

F. O. WEEKS,  
Chief Treasury Officer.

Certified Correct,

D. B. FINN,  
Deputy Minister.

## FINANCIAL STATEMENT DEPARTMENT OF FISHERIES, 1943-44

Vote No.	Appropriation	Amount Authorized		Expenditure	
		\$	cts.	\$	cts.
Statutory	Minister's Salary and Car Allowance.....	12,000	00	12,000	00
70	Departmental Administration.....	146,200	00	136,192	94
71	Salaries and Disbursements of Fishery Officers and Guardians.....	845,400	00	525,770	89
	Fisheries Patrol Service.....			231,246	43
	Fisheries Protection Service.....			39,927	06
72	Building Fishways and Clearing Rivers.....	7,000	00	939	54
73	Development of the Deep Sea Fisheries and the Demand for Fish.....	40,000	00	29,426	29
74	Fish Culture.....	193,800	00	170,633	67
75	Oyster Culture.....	26,950	00	20,981	65
76	Fisheries Research Board of Canada.....	238,000	00	225,473	61
77 & 464	International Fisheries Commission (Halibut).....	27,100	00	19,606	49
78 & 464A	International Pacific Salmon Fisheries Commission.....	42,000	00	41,742	36
79	Grant to United Maritime Fishermen's Association.....	3,000	00	3,000	00
80	Expenses <i>re</i> Pelagic Sealskins.....	50,000	00	38,986	25
81	Harbour Seal Bounty.....	15,000	00	6,245	00
82	Board of Inquiry—Great Lakes Fisheries.....	900	00	590	16
465	International Pacific Salmon Fisheries Commission (Hell's Gate).....	10,500	00	10,493	17
466	Replacement of Gaspé Peninsula Fisheries Experimental Station.....	45,000	00	20,778	04
467	Assistance for construction of plant for the production of pure Fishery salt from Malagash deposits.....	30,000	00	1,630	65
Statutory	Fishing Bounty.....	159,400	80	159,400	80
Statutory	Miscellaneous Civil Service Gratuities.....	970	00	970	00
	Total Ordinary Expenditure.....	1,893,220	80	1,696,035	00
	SPECIAL EXPENDITURE				
83	Extension of educational work in co-operative producing and selling among Fishermen.....	50,000	00	48,116	90
	Total Special.....	50,000	00	48,116	90
	SPECIAL WAR EXPENDITURE				
Statutory	War Appropriation Act, 1943—				
	Wartime Fisheries Advisory Committee.....	500	00	39	85
	Subsidy <i>re</i> Fishing Vessels Construction in B.C.....	200,000	00	121,536	11
	Construction and Operation of Experimental Vessel—East Coast.....	59,806	30	47,032	68
	Subsidy <i>re</i> Fishing Vessels Construction—East Coast.....	50,000	00	22,088	55
	War Risk Compensation.....	10,000	00		
	Expenses <i>re</i> supply of Frozen Fish—British Ministry of Food.....	15,000	00	10,758	29
	Prairie Provinces Fisheries Investigation Committee.....	3,000	00	2,041	28
	War Bonus to crews of Fisheries Vessels.....	20,000	00	15,074	08
	Salt Fish Export Regulations (Administration).....	20,000	00	15,722	53
	Total Special War.....	378,306	30	234,293	37
	(Pacific Halibut Treaty Special Account—(Finance Department)).....	\$		3,917	34
	(Pacific Salmon Treaty Special Account—(Finance Department)).....			6,079	24
(a)	(Pacific Salmon Treaty (Hell's Gate) Special Account (Finance Department)).....			7,795	27
	(Province of British Columbia (Fisheries Research Board) Special Account—(Finance Department)).....			570	00
	(British Ministry of Food—Salmon.....			2,439,032	20
(b)	(British Ministry of Food—Herring.....			6,168,261	88
	(British Ministry of Food—Frozen Fish.....			855,178	17

FINANCIAL STATEMENT DEPARTMENT OF FISHERIES, 1943-44—*Con.*

(c)	{ Mutual Aid—Salmon.....	\$ 6,800,784 66
	{ Mutual Aid—Herring.....	3,972,116 67
	{ Mutual Aid—Frozen Fish.....	488,577 22
Grand Total.....		<u>\$ 22,720,757 92</u>

(a) Balances due by the United States and the Province of British Columbia at the close of the fiscal year 1943-44 on account of divisible expenditures.

(b) Purchases of salmon, herring and Frozen Fish by the British Government through credit arrangements with the Bank of Canada.

(c) Purchases of salmon, herring and Frozen Fish through the Mutual Aid Board for allocation to the United Nations.

Certified Correct,  
F. O. WEEKS,  
Chief Treasury Officer

Certified Correct,  
D. B. FINN,  
Deputy Minister.

*Salaries and Disbursements of Fishery Officers and Guardians*

## EXPENDITURE AND SUMMARY 1943-44

NOVA SCOTIA—		
General.....	1,408 72	
Head Office.....	29,906 40	
District No. 1.....	41,227 64	
District No. 2.....	55,152 84	
District No. 3.....	59,008 21	
		186,703 81
PRINCE EDWARD ISLAND—		
General.....	436 94	
District No. 1.....	35,425 14	
District No. 2 (Magdalen Islands).....	1,639 62	
		37,501 70
NEW BRUNSWICK—		
General.....	1,099 23	
District No. 1.....	26,036 26	
District No. 2.....	60,245 89	
District No. 3.....	35,349 21	
		122,730 59
FISH INSPECTION OFFICE—EAST COAST.....		4,660 03
GENERAL EAST.....		2,297 7 2
BRITISH COLUMBIA—		
Head Office.....	27,814 85	
District No. 1.....	35,553 21	
District No. 2.....	41,810 92	
District No. 3.....	46,204 18	
Canned Fish Inspection Office.....	15,926 28	
		167,309 44
GENERAL WEST.....		4,567 60
		<u>\$ 525,770 89</u>

## SUMMARY

Nova Scotia.....	\$ 192,323 43
Prince Edward Island.....	36,053 99
New Brunswick.....	123,306 33
Quebec.....	2,210 10
British Columbia.....	171,877 04
	<u>\$ 525,770 89</u>



*Fisheries Patrol Service*

## EXPENDITURE AND SUMMARY 1943-44

NOVA SCOTIA—			
District No. 1			
Chartered Boats.....		980 22	
District No. 2			
Departmental Boats.....	9,261 39		
Chartered Boats.....	103 99		
		9,365 38	
District No. 3			
Departmental Boats.....	12,461 33		
Chartered Boats.....	1,080 00		
		13,541 33	
		\$	23,886 93
PRINCE EDWARD ISLAND—			
Departmental Boats.....	3,048 38		
Chartered Boats.....	5,822 75		
			8,871 13
NEW BRUNSWICK—			
District No. 1			
Departmental Boats.....		23,694 38	
District No. 2			
Chartered Boats.....		14,962 33	
			38,656 71
BRITISH COLUMBIA—			
District No. 1			
Departmental Boats.....		22,534 48	
District No. 2			
Departmental Boats.....	43,905 71		
Speed Boats.....	300 00		
Chartered Boats.....	37,884 00		
		82,089 71	
District No. 3			
Departmental Boats.....	22,174 14		
Chartered Boats.....	24,815 60		
		46,989 74	
Digby Island Warehouse.....	4,378 18		
New Westminster Warehouse.....	3,702 55		
General.....	137 00		
		8,217 73	
			159,831 66
		\$	231,246 43

## SUMMARY

Nova Scotia.....	23,886 93
Prince Edward Island.....	8,871 13
New Brunswick.....	38,656 71
British Columbia.....	159,831 66
	\$ 231,246 43

*Fisheries Protection Service*

## EXPENDITURE SUMMARY 1943-44

West Coast.....	\$ 39,927 06
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*Development of the Deep Sea Fisheries and the Demand for Fish*

## EXPENDITURE 1943-44

Aids in expanding demands for Fish.....	\$ 8,631 22
Educational Work.....	11,640 01
Miscellaneous.....	2,499 29
Subsidy for bait Freezers.....	100 00
Fisheries Intelligence Bureau.....	760 45
Advertising.....	4,669 20
Fish Collection Service.....	1,126 12
	\$ 29,426 29

## Fisheries Research Board of Canada

## EXPENDITURE 1943-44

	Expenditures					
	From Vote		From Receipts		Total	
	\$	cts.	\$	cts.	\$	cts.
Atlantic Biological Station—St. Andrews, N.B. ....	50,912	29			50,912	29
Atlantic Experimental Station—Halifax, N.S. ....	45,060	94			45,060	94
Gaspé Experimental Station—Grand River, Que. ....	14,530	93			14,530	93
Pacific Biological Station—Nanaimo, B.C. ....	52,874	49	9,951	10	62,825	59
Pacific Experimental Station—Vancouver, B.C. ....	37,913	97			37,913	97
Administration and General—						
Toronto Office (A.G. Huntsman) .....	10,216	33			10,216	33
Atlantic Salmon Investigations .....	4,082	62			4,082	62
Travelling Expenses .....	6,517	26			6,517	26
Publications .....	2,174	08			2,174	08
Miscellaneous .....	1,190	70	233	86	1,424	56
	225,473	61	10,184	96	235,658	57

## STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR 1943-44 FOR CANNED SALMON PURCHASED FOR THE BRITISH MINISTRY OF FOOD

Grade	Size	No. of tins per case	No. of cases	Rate per case
				\$ cts.
<i>Payments on balance of 1942-43 Pack—</i>				
A-1 .....	$\frac{1}{2}$ lb.	96	1,621	17 50
	1 lb.	48	1,275	16 25
A-2 .....	$\frac{1}{2}$ lb.	96	1,183	12 75
	1 lb.	48	1,258	11 50
A-3 .....	$\frac{1}{2}$ lb.	96	1,175	7 50
	$\frac{1}{4}$ lb.	96	12	5 00
	1 lb.	48	8,694	6 25
B-1 .....	$\frac{1}{2}$ lb.	96	3,358 $\frac{1}{2}$	14 00
	1 lb.	48	2,402	12 75
B-2 .....	$\frac{1}{2}$ lb.	96	120	11 25
B-3 .....	$\frac{1}{2}$ lb.	96	265	6 75
	1 lb.	48	70	5 50
B-1 (tips and tails) .....	$\frac{1}{2}$ lb.	96	56	10 50
Total No. of cases .....			21,489 $\frac{1}{2}$	

(Equiv. in full cases (48 lbs. per case)—21,483 $\frac{1}{2}$ )

Expenditure made for fish, as above, plus 5% balances on shipments made from storage and on which 95% payment was made in 1942-43. ....\$ 392,556 55

Payments to canners for affixing labels .....	1,820 92
Printing of labels .....	5,050 26
Rail Freight .....	214,713 13
Ocean Freight .....	15,145 72
Carrying charges at 2% to cover storage and insurance .....	30,665 08
Interest charges at 5% on payments delayed for over 30 days .....	3,947 45
Cartage .....	3,492 43
Miscellaneous .....	883 77

Total expenditure on 1942-43 Pack .....

\$ 668,275 31

Grade	Size	No. of tins per case	No. of cases	Rate per case
<i>Payments on 1943-44 Pack—</i>				\$ cts.
A-1.....	$\frac{1}{2}$ lb.	96	83,462	17 50
	$\frac{1}{4}$ lb.	96	84,638	10 50
	1 lb.	48	2,466	16 25
A-2.....	$\frac{1}{2}$ lb.	96	77,164	12 75
	$\frac{1}{4}$ lb.	96	37,552	8 12 $\frac{1}{2}$
	1 lb.	48	7,196	11 50
A-3.....	$\frac{1}{2}$ lb.	96	308,852	7 50
	$\frac{1}{4}$ lb.	96	32,893	5 00
	1 lb.	48	292,156	6 25
B-1.....	$\frac{1}{2}$ lb.	96	1,911	14 00
	$\frac{1}{4}$ lb.	96	419	8 75
B-2.....	$\frac{1}{2}$ lb.	96	717	11 25
	1 lb.	48	18	10 00
B-3.....	$\frac{1}{2}$ lb.	96	3,211	6 75
	$\frac{1}{4}$ lb.	96	337	4 62 $\frac{1}{2}$
	1 lb.	48	2,241	5 50
B-1 (flakes).....	$\frac{1}{2}$ lb.	96	2	10 50
Total No. of cases .....			935,241	

(Equiv. in full cases (48 lbs. per case)—857,318 $\frac{1}{2}$ )

*Expenditure for 1943-44 Pack—*

For fish, as above.....	\$ 8,039,134 99
Payments to canners for affixing labels.....	64,182 19
Printing labels.....	97,924 01
Rail freight.....	368,622 42
Carrying charges @ 2% to cover storage and insurance.....	284 27
Miscellaneous.....	1,393 67

Total expenditure on 1943-44 Pack.....\$ 8,571,541 55

Total.....\$ 9,239,816 86

*Funds for above furnished as follows—*

By the Br. Ministry through the Bank of Canada.....	\$ 2,439,032 20
By the Canadian Mutual Aid Board:	
Mutual Aid Appropriation.....	5,710,970 37
United Kingdom Cash Receipts Account.....	1,089,814 29

\$ 9,239,816 86

STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR 1943-44 FOR CANNED SALMON PURCHASED FOR THE BRITISH MINISTRY OF FOOD

A quantity of Canned Salmon was released from the Ministry's stock in warehouses to the Colonies in the West Indies, to the Bahamas, to the Department of Munitions and Supply and for Ship's stores, and refunds were forwarded to the Bank of Canada for credit to the account of the British Ministry of Food, amounting to \$279,115.28.

The goods so shipped were as follows:—

*To the West Indies—*

2,400 cases Gr. A-1, 48 x 1	
55 " A-2, 96 x $\frac{1}{2}$	
739 " A-2, 48 x 1	
6,811 " A-3, 96 x $\frac{1}{2}$	
19,477 " A-3, 48 x 1	
811 " B-1, 48 x 1	

30,293

*To the Bahamas—*

40 cases Gr. A-2, 96 x $\frac{1}{2}$	
1,000 " A-3, 48 x 1	

1,040

*To the Department of Munitions and Supply—*

4,338 cases, Gr. A-2, 48 x 1	
992 " A-3, 48 x 1	

5,330

*For Ship's Stores—*

2,150 cases, Gr. A-2, 48 x 1

Refunds amounting to \$1,740.34 were also made to the Ministry's account in the Bank of Canada covering shortages in shipment due to incorrect count when goods were placed in storage. The quantity involved was—207 $\frac{1}{2}$  cases.

A quantity of 40 cases of Grade A-3, talls, was rejected on re-inspection and a refund of \$239.40 was made to the Ministry's account in the Bank of Canada.

An additional refund of \$114.54 was also made to cover a shortage in delivery of Canned Salmon labels. Total refunds made directly to the Bank of Canada—\$281,209.56.

STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR  
1943-44 FOR CANNED HERRING PURCHASED FOR THE BRITISH MINISTRY OF  
FOOD

## EAST COAST—

## 1942-43 Pack—

Payment for 29 cases sardines (100- $\frac{1}{4}$ lb cans per case) at \$4.25.....	\$	123 25	
Freight on same.....		2 60	
			\$ 125 85

## 1943-1944 Pack—

Type of Container	Size	No. of cans per case	No. of cases	Rate per case	
Ovals (in T.S.)....	1 lb.	48	26,018	\$ 5 65	
Ovals (in T.S.)....	$\frac{1}{2}$ lb.	48	4,700	4 30	
Ovals (in oil).....	$\frac{1}{2}$ lb.	48	2,100	4 55	
Total number of cases.....			32,818		
Payments for fish.....				\$	176,766 70
Payments for freight.....					4,078 10
					\$ 180,844 80

Total expenditure—East Coast.....\$ 180,970 65

## WEST COAST—

## Payments on 1941-42 Pack—

10% balance on fish shipped from storage.....	\$	834 88	
Freight on same.....		1,496 00	
Carrying charges at 2% for storage and insurance.....		216 84	
For tomato puree not supplied by the Ministry...		4,614 75	
Total expenditure on 1941-42 Pack.....	\$	7,162 47	

## Payments on 1942-43 Pack—

Type of Container	Size	No. of cans per case	No. of cases	Rate per case	
Ovals.....	1 lb.	48	847,598	\$ 4 80	
Talls.....	1 lb.	48	96,828	4 22	
Ovals.....	$\frac{1}{2}$ lb.	48	257,732	3 95	

Total number of cases..... 1,202,158

Expenditure for fish, including 5% balance on goods shipped from storage, 95% having been paid in the fiscal year 1942-43.....	\$	5,486,745 48	
Rail freight.....		491,182 51	
Ocean freight.....		110,769 80	
Carrying charges at 4% for storage and insurance.		69,985 06	
Miscellaneous (Cartage, terminal charges, etc)..		2,290 71	

Total Expenditure on 1942-43 Pack.....\$ 6,160,973 56

## Payments on 1943-44 Pack—

Type of Container	Size	No. of cans per case	No. of cases	Rate per case	
Ovals.....	1 lb.	48	609,451	\$ 4 80	
Talls.....	1 lb.	48	73,323	4 22	
Ovals.....	$\frac{1}{2}$ lb.	48	93,677	3 95	

Total number of cases..... 776,451

Expenditure for fish (95% in some instances).....	\$	3,522,990 31	
Rail freight.....		234,727 94	
Ocean freight.....		33,444 37	
Miscellaneous (Storage, marking, etc.).....		109 25	

Total expenditure on 1943-44 Pack.....\$ 3,791,271 87

Total Expenditure—West Coast.....\$ 9,959,407 90

Total expenditure East and West Coasts.....\$10,140,378 55



STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR  
1943-44 FOR CANNED HERRING PURCHASED FOR THE BRITISH MINISTRY OF  
FOOD—Continued

Funds for above furnished as follows:—

By the Br. Ministry through the Bank of Canada.....	\$ 6,168,261 88
By the Canadian Mutual Aid Board:—	
Mutual Aid Appropriation.....	1,424,309 77
U.K. Cash receipts Account.....	2,547,806 90
	<u>\$10,140,378 55</u>

A quantity of canned herring was shipped from the Ministry's stock in warehouses to the Colonies in the West Indies and refunds were forwarded to the Bank of Canada for credit to the account of the British Ministry of Food, amounting to \$220,126.32.

The quantities shipped were:

39,239 cases, 1 lb. ovals.  
10,276 cases, 1 lb. talls.

49,515 cases.

Refunds amounting to \$240.87 were also made to the Ministry's account in the Bank of Canada, covering shortages in shipment due to incorrect count when goods were placed in storage. The quantity involved was:—

52 cases, 1 lb. ovals.  
1 case  $\frac{1}{2}$  lb. ovals.

53 cases.

Total refunds made directly to the Bank of Canada—\$220,367.19.

STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR  
1943-44 FOR FROZEN FISH PURCHASED FOR THE BRITISH MINISTRY OF FOOD

Kind of Fish	Quantity	Rate per lb.	
<b>WEST COAST—</b>			
Flat fish (Brills, Soles, Witches, etc.).....	2,500	6½¢ (samples)	
Flat fish (Brills, Soles, Witches, etc.).....	794,000	7½¢	
Halibut.....	150,069	25¢ (less part freight)	
	946,569		
<i>Expenditure—</i>			
For fish.....		\$97,038 81	
For freight, icing charges, etc.....		21,867 39	
			\$118,906 20
<b>EAST COAST—</b>			
<i>Quebec—</i>			
Flat fish.....	65,730	7½¢	
Yellowtails.....	90	8	
Cod.....	2,031,658	17	
Cod.....	118,848	16½	
Hake (samples).....	135	8	
Hake ".....	900	17	
	2,217,361		
<i>Expenditure—</i>			
For fish.....		\$370,361 30	
For freight, icing charges, etc.....		13,260 13	
			383,621 43
<b>NEW BRUNSWICK—</b>			
Flat fish.....	59,400	7½	
Cod.....	273,990	17	
	333,390		
<i>Expenditure—</i>			
For fish.....		\$51,033 30	
For freight, etc.....		2,091 01	
			53,124 31
<b>NOVA SCOTIA—</b>			
Flat fish.....	897,375	7½	
Yellowtails.....	255,900	8	
Cod.....	2,293,425	17	
Cod.....	1,376,535	16½	
Pollock.....	413,100	12	
Pollock.....	22,191	11½	
Cusk (samples).....	375	11½	
	5,258,901		

## DEPARTMENT OF FISHERIES

STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR  
1943-44 FOR FROZEN FISH PURCHASED FOR THE BRITISH MINISTRY OF FOOD

<i>Expenditure—</i>	
For fish.....	\$760,449 57
For freight, etc.....	10,839 32
	<hr/> 771,288 89
<i>East General—</i>	
Expenditure for storage, Misc. transportation, costs, etc.....	16,814 56
	<hr/> \$1,343,755 39

<i>Totals—</i>	
Total quantities—West Coast.....	946,569 lbs.
—East Coast.....	7,809,652 lbs.
	<hr/> 8,756,221 lbs.

<i>Total Expenditures—</i>	
For fish—West Coast.....	97,038 81
—East Coast.....	1,181,844 17
	<hr/> \$1,278,882 98
For freight etc.—West Coast.....	21,867 39
—East Coast.....	43,005 02
	<hr/> 64,872 41
	<hr/> 1,343,755 39

## Funds for above furnished as follows:—

By Br. Min. of Food through Bank of	
Canada.....	855,178 17
By Canadian Mutual Aid Board:	
From Mutual Aid Appropriation.....	434,061 12
From United Kingdom Cash receipts	
Account.....	54,516 10
	<hr/> \$1,343,755 39

## FISHERIES EXPENDITURES 1943-44 BY PROVINCES

Appropriation	General		Nova Scotia		Prince Edward Island		New Brunswick		Quebec		Ontario		British Columbia		Total	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
Salaries and Disbursements of Fishery Officers and Guardians.....			192,323 43		36,053 99		122,308 33		2,210 10				171,877 04		525,770 99	
Fisheries Protection Service.....			23,886 93		8,871 13		38,656 71						189,881 06		231,246 53	
Building Fishways and Clearing Rivers.....				43 32			689 00						207 22		389 94	
Development of the Deep Sea Fisheries and the Demand for Fish.....			8,975 73		2,926 19		1,986 16		2,851 93		1,944 26		3,430 30		29,359 24	
Fish Culture.....	7,311 72		94,343 16		8,962 54		54,218 86								170,683 77	
Oyster Culture.....	13,109 11		5,878 01		14,578 79		363 68								20,083 51	
Fisheries Research Board of Canada.....	161 17		45,060 94		5,078 58		45,833 71		14,530 93				90,788 46		223,473 61	
International Fisheries Commission (Halibut).....	24,180 99												19,606 49		19,606 49	
International Pacific Salmon Fisheries Commission.....			1,000 00		1,000 00		1,000 00						41,742 36		41,742 36	
International Pacific Salmon Fisheries Comm. (Hell's Gate).....			2,585 00		387 50		770 00						10,493 17		3,000 00	
Grant to United Maritime Fishermen Association.....			76,373 70		10,346 60		20,886 10		51,794 40				2,502 50		38,886 25	
Expenses re Pelagic Seal Skins.....	38,986 25														6,245 00	
Harbour Seal Bounty.....															159,400 80	
Fishing Bounty.....																
Extension of Educational Work in Co-Operative Producing and Selling among Fishermen.....																
Board of Inquiry—Great Lakes Fisheries.....	590 16								8,000 00				3,143 33		48,116 90	
Assistance for Construction of Plant for the Production of Pure Fishery Salt from Miramichi Deposits.....															590 16	
Replacement of Gaspe Peninsula Fisheries Experimental Station.....															1,630 65	
War Appropriation Act, 1943:—									20,778 04						20,778 04	
War-time Fisheries Advisory Committee.....	39 85														39 85	
Subsidy re Fishing Vessels Construction in British Columbia.....													121,536 11		121,536 11	
Construction and Operation of Experimental Vessel—East Coast.....			47,032 68												47,032 68	
Subsidy re Fishing Vessels Construction—East Coast.....			22,058 55												22,058 55	
Expenses re Supply of Frozen Fish—British Ministry of Food.....			8,686 68				1,599 11						472 50		10,758 29	
War-time Provinces Fisheries Investigation Committee.....	2,041 28														2,041 28	
War-time Provinces Fisheries Investigation Committee.....																
Bonus to Crews of Fishing Vessels.....			1,761 26		256 63		1,361 60						11,694 59		15,074 08	
Salmon Fishery Export Regulations (Administration).....			8,136 89		1,963 92		1,971 94		3,649 78						15,723 53	
Department of Fisheries Administration.....	136,192 94														136,192 94	
Minister of Fisheries.....																
Salary and Car Allowance.....	12,000 00														12,000 00	
Miscellaneous Civil Service Gratuities.....	970 00														970 00	
Special Accounts—Finance Dept.—																
(a) Halibut Treaty.....																
(a) Salmon Treaty.....																
(a) Salmon Treaty (Hell's Gate).....																
(b) Province of British Columbia—																
Herring and Pilechard Investigation.....																
(c) British Ministry of Food—Salmon.....																
(c) British Ministry of Food—Frozen Fish.....																
(c) British Ministry of Food—Herring.....																
			440 951 50				29,154 25		318,265 27				2,439,032 20		2,439,032 20	
							125 85						6,168,136 03		6,168,261 83	

## FISHERIES EXPENDITURES 1943-44 BY PROVINCES —Concluded.

Appropriation	General		Nova Scotia		Prince Edward Island		New Brunswick		Quebec		Ontario		British Columbia		Total		
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	
Dept. of Fisheries:—																	
(d) Mutual Aid—Salmon.....													5,710,970	37	5,710,970	37	
(d) Mutual Aid—Herring.....													1,243,464	97	1,243,464	97	
(d) Mutual Aid—Frozen Fish.....													9,421	47	9,421	47	
(d) Mutual Aid—(U.K. Cash)—Salmon.....			343,555	83			180,844	80					1,089,814	29	1,089,814	29	
(d) Mutual Aid—(U.K. Cash)—Herring.....							23,970	06					2,547,806	90	2,547,806	90	
—Frozen Fish.....													42,677	58	42,677	58	
	235,583	47	1,347	633	37	93,580	17	540,403	48	487,867	57	1,944	26	20,013,745	60	22,720,757	92

NOTE.—(a) Balance due by the United States Government on divisible expenses incurred during the fiscal year 1943-44.  
 (b) Balance due by the Province of British Columbia on divisible expenses incurred during the fiscal year 1943-44.  
 (c) Purchases of fish by the British Government through credit arrangements with the Bank of Canada.  
 (d) Purchases of fish through the Mutual Aid Board for allocation to the United Nations and friendly neutral countries.



## EXPENDITURES BY THE DOMINION GOVERNMENT ON ACCOUNT OF FISHERIES SERVICE SINCE CONFEDERATION

—	Fish Inspection etc.	Fish Culture	Fisheries Research Board	Dev. D. S. Fish, etc.	Fishing Bounty	Sundry Services	Total
To 1940-41 (a)	34,442,683 45	11,388,022 90	3,933,601 99	2,382,254 64	9,348,621 07	10,356,689 88	71,851,873 93
1941-42....	750,996 22	175,952 43	221,458 93	29,427 68	159,959 60	475,691 95	1,813,486 81
1942-43....	763,945 71	181,027 36	217,040 76	30,381 14	159,930 60	563,589 29	1,915,914 86
1943-44....	796,944 38	170,633 67	225,473 61	29,426 29	159,400 80	21,338,879 17	22,720,757 92
	36,754,569 76	11,915,636 36	4,597,575 29	2,471,489 75	9,827,912 07	32,734,850 29	98,302,033 52

(a) For details by fiscal years see Appendix No. 6 of the Departmental Report for 1940-41.

## SUMMARY BY PROVINCES

	Total
General.....	\$ 6,663,923 44
Nova Scotia.....	21,972,136 89
Prince Edward Island.....	3,714,235 17
New Brunswick.....	11,272,607 51
Quebec.....	6,376,739 04
Ontario.....	4,209,533 38
Manitoba.....	1,816,514 96
Manitoba and North West Territories.....	24,771 76
North West Territories.....	71,242 18
Saskatchewan.....	580,086 15
Alberta.....	641,689 70
British Columbia.....	40,929,195 91
Yukon.....	29,358 43
	<u>\$ 98,302,033 52</u>

## REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE CONFEDERATION

—	Fisheries Revenue and Fines and Forfeitures	Casual Revenue	Pelagic Sealing Revenue	Sundry Revenues	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
To 1940-41 (a).....	5,787,534 83	247,622 11	1,757,411 34	5,149,693 32	12,942,261 60
1941-42.....	80,299 57	9,897 20	325,131 12	40,403 57	455,731 46
1942-43.....	82,906 87	7,717 42	212,131 35	17,276 70	320,032 34
1943-44.....	80,333 20	5,091 68	219,260 71	735 07	305,420 66
	6,031,074 47	270,328 41	2,513,934 52	5,208,108 66	14,023,446 06

(a) For details by fiscal years see Appendix No. 6 of the Departmental Report for 1940-41.

## SUMMARY BY PROVINCES

	Total
General.....	\$ 7,351,787 11
Nova Scotia.....	822,895 47
Prince Edward Island.....	198,321 03
New Brunswick.....	737,847 55
Quebec.....	359,056 88
Ontario.....	561,139 94
Manitoba.....	335,474 08
Manitoba and North West Territories.....	7,416 45
North West Territories.....	9,498 23
Hudson Bay District.....	1,191 88
Saskatchewan.....	95,152 41
Alberta.....	234,710 87
British Columbia.....	3,290,295 41
Yukon.....	18,658 75
	<u>\$ 14,023,446 06</u>



DOMINION OF CANADA

FIFTEENTH  
ANNUAL REPORT

OF THE  
DEPARTMENT OF FISHERIES

(SEVENTY-EIGHTH ANNUAL FISHERIES REPORT  
OF THE DOMINION)

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FOR THE YEAR

1944-45



OTTAWA  
EDMOND CLOUTIER  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
1945





*To His Excellency Major-General the Right Honourable the Earl of Athlone,  
K.G., P.C., G.C.B., G.M.M.G., G.C.V.O., D.S.O., A.D.C., Governor  
General and Commander-in-Chief of the Dominion of Canada*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour herewith, for the information of Your Excellency and the Parliament of Canada, to present the Fifteenth Annual Report of the Department of Fisheries, being the Seventy-eighth Annual Fisheries Report for the Dominion.

I have the honour to be,

Your Excellency's most obedient servant,

H. FRANCIS G. BRIDGES,  
*Minister of Fisheries.*

DEPARTMENT OF FISHERIES,  
Ottawa, October 1, 1945.





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## REPORT OF THE DEPUTY MINISTER

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To the Hon. H. FRANCIS G. BRIDGES, M.P.,  
Minister of Fisheries.

SIR,—I have the honour to submit the Fifteenth Annual Report of the Department of Fisheries, which covers the fiscal year 1944-45 and is the Seventy-eighth Annual Report on the Fisheries of the Dominion. For reasons of economy, the report, like those of other recent years, has been kept to smaller limits than the annual reports issued in some earlier periods. The condensation consists in giving lessened space to matters of detail.

The report takes up such matters as the results of commercial fishing operations in the Dominion during the calendar year 1944, exportation of products of the fisheries during the year, operations of international fisheries commissions of the Pacific coast, and so on. Appendices to the report take up several branches of the Dominion's work in some detail though here, too, detail has been kept to smaller limits than in some other years. These appendices are:—

Reports of the Chief Supervisors of Fisheries.

Report on the Fish Culture Work of the Department.

Report on Oyster Culture and the Further Development of Oyster Farming.

Report of the Fisheries Engineer.

Reports as to the Operations of the Fish Inspection Laboratories.

The Annual Financial Statement of the Department.

### COMMERCIAL FISHERIES IN 1944

Throughout 1944 there was continuation of the upward trend in fisheries production value that had been evident in earlier war years. In result, the total marketed value of the 1944 catch exceeded \$89,600,000, much the largest dollar return in the history of the Dominion's fishing industry. The explanation of the continued process of increase is to be found, of course, in the continued great demand for fisheries products and in firmness of prevailing prices for such goods, not in greater production. As for production, however, it may well be emphasized here that the fishing industry deserves high credit for what it has done in maintaining wartime output at approximately the pre-war level in spite of a good many difficulties arising out of the times.

The 1944 increase over the marketed value total for the preceding year was some \$4,000,000. As compared with the dollar return in 1938, the last full year of peace, 1944 showed a gain of about 120 per cent and in comparison with the largest value total recorded in any peacetime period of the past—slightly less than \$56,400,000 in 1926—the 1944 figures showed an increase of nearly 60 per cent.

Complete and detailed figures relative to Canada's fisheries production, size of working force in the fishing industry, number of vessels and boats and processing plants and other like data, are given in the annual publication known as *Fisheries Statistics of Canada*. That report is prepared by the Department and the Dominion Bureau of Statistics, jointly, with the collaboration of

provincial services in those parts of the country where fisheries administration is in the hands of the provinces—Quebec, Ontario, and the three Prairie Provinces. Since the statistical paper gives these detailed data the present paragraphs dealing with 1944 operating results will only concern themselves, except in a few instances, with production in the sea fisheries of British Columbia and the Maritime Provinces, which are under the Department's administration. That is, the same thing as saying that the comments here are concerned with fisheries which ordinarily produce more than four-fifths of the country's annual landings of fish and shellfish. Most of the remaining one-fifth comes from the freshwater fisheries, although it includes important quantities of fish and shellfish taken by Quebec sea fishermen.

*Working Force and Industrial Production in 1944*—Combined landings from the sea fisheries of the Maritime Provinces and British Columbia in the calendar year 1944, something over 994,800,000 pounds, were smaller than the 1943 catch but they brought the fishermen an increased return in dollars and the finished products were worth, as marketed, \$73,100,000, a gain of more than \$4,975,000. (In general, round figures only are being used in this review.) So far as money return to the fishermen was concerned—that is, the value of the catch as landed—the \$39,360,000 total showed an increase of nearly \$3,860,000.

In making the catch nearly 38,600 fishermen were at work or over 1,300 more than in 1943. Plant employees who prepared the catch for market, and thus shared in creating the marketed value return for the year, numbered 15,450, an increase of something less than 1,200. Capital equipment in use, including vessels, boats, gear, plant and machinery, represented an investment of \$56,-800,000, which was \$4,200,000 and more above the 1943 figure. In number of fishermen, number of plant workers, and capital investment there was an increase in each of the four provinces.

*Catch, by Provinces*—Shown by provinces, in round figures, the year's sea catch and landed value were as follows:—

	<i>Catch Taken</i> <i>Cwts.</i>	<i>Landed Value</i> <i>\$</i>
British Columbia .....	4,583,200	17,333,300
Nova Scotia .....	3,345,500	14,851,300
New Brunswick .....	1,747,300*	5,377,100*
Prince Edward Island .....	272,200	1,797,300

\* New Brunswick commercial fishermen also caught 4,700 hundredweights of freshwater fish which had a landed value of \$27,500.

In Nova Scotia there was catch increase, as compared with 1943 landings, but in each of the other provinces decrease. As for landed value, there was gain in Nova Scotia and gain, too, both in New Brunswick and British Columbia, notwithstanding the falling off in landings in the latter provinces. There were catch and landed value decreases in Prince Edward Island. Marketed value increased in the first three provinces but not in Prince Edward Island.

Bigger catches of cod and other groundfish and increase in herring landings had most to do with Nova Scotia's gain in production. In the main, New Brunswick's lowered catch figures were due to smaller landings of herring and sardines. Reduction in hake and cod fares explain most of the drop in Prince Edward Island total. One noteworthy result of the year's fishing in the Maritimes was an increase in lobster catch, which will be referred to further in a later paragraph.

Principal factors contributing to the decrease in Pacific Coast catch were the reductions in the quantities of pilchards and salmon that were taken. In volume, the pilchard decrease was much the greater, in what it represented in dollars the salmon decrease the more important, since salmon are much more valuable fish than pilchards. Even at that, however, some stiffening in prices

brought the marketed value of the diminished salmon catch about \$880,000 above the 1943 mark, or up to more than \$15,620,000.

Apropos of these catch reductions it may be pointed out that fluctuations in production from year to year take place in all fisheries. They may result from various factors or from a combination of factors operating at the same time. Smaller catch from a fishery in some particular year *may* turn out to have been indicative of a lessening in abundance of stock but it is not necessarily an indication of that kind. Catch comparisons covering only a year or two of the operations in a fishery are not to be relied upon as a basis for conclusions as to changes in abundance in the fishing stock; much more study than that is required to reach sound conclusions. As for pilchards, sharp rise and fall in the curve of apparent availability in British Columbia waters is quite a common state of affairs. Study has not yet been carried far enough to find the explanation of this condition. In the case of salmon, fluctuations in the size of the runs have been much less pronounced than the ups-and-downs in the pilchard fishery but they have been evident over the years, and evident, of course, not only in British Columbia areas but elsewhere as well—in the big Alaska fishery, for instance. In this connection it may be added that while British Columbia's catch of salmon was considerably smaller in 1944 than in 1943 it is already clear, as this report is written, that 1945 landings will not only be much larger than last year's but also well ahead of the 1943 catch. As a further fact of interest it may be said, too, that at the instance of the Department, the Fisheries Research Board of Canada has been extending its studies of British Columbia salmon and the salmon fishery with a view to determining what are the underlying causes of the variations in the runs and what corrective or controlling measures may be possible.

In further reference to Pacific Coast catch it may be sufficient to point out that, as already indicated, the decrease in aggregate 1944 landings was due to smaller quantities of pilchards and salmon being taken. In the herring and halibut fisheries, which, with the salmon and pilchard fisheries, make up British Columbia's "Big Four", the catches increased, though the halibut figures did not change greatly. In the remaining provincial fisheries, twenty-five or so, taken as a group, there was some rise in production.

*Marketed Value*—The following table sets out the year's marketed value totals for the sea fisheries, by provinces, and the increase or decrease in each case, as compared with 1943 figures, with round numbers used in all instances:—

	1944 \$	Change \$
British Columbia .....	34,901,000	+2,422,300
Nova Scotia .....	23,662,000	+1,977,600
New Brunswick .....	11,096,400 <sup>a</sup>	+ 838,700
Prince Edward Island .....	2,598,900	— 261,900

<sup>a</sup> In addition, there was a marketed value return of \$27,500 from New Brunswick's commercial freshwater fisheries.

*The Salmon Fishery*—In point of marketed value, \$15,623,200, British Columbia's salmon fishery continued to hold its established top position among the Dominion's fisheries, notwithstanding that its catch for the year was disappointing. The cod fishery, almost wholly in Atlantic waters, was in second place, with a value aggregate of \$11,975,500 for the landings in the four provinces particularly under review here. Were the figures for Quebec, the other cod producing province, also taken into account the year's cod value for the Dominion would reach \$14,800,000 or more. In third position, as to marketed value, \$10,200,000, was the herring fishery, which had been in second place in the year before. Adding in Quebec figures would lift the herring total fairly substantially but not enough to bring it up to the cod value.



Salmon, cod, and herring would be found to hold their places of leadership among all Canadian fisheries even were these paragraphs to concern themselves with fisheries results in all nine provinces in 1944, not simply with results in four. No other fisheries approach salmon, cod and herring in dollar importance, except the lobster fishery.

Canning is the major branch of the Pacific salmon industry, of course, but with 1944 bringing sharp reduction in raw material landings the cannery output dropped to a low figure—as a matter of fact, the lowest in years, or under 1,098,000 cases. Most of the fish was supplied to the United Kingdom. As compared with 1943 output, the pack showed a decrease of more than 160,000 cases. However, as this report is written, there is the encouraging indication that 1945 production from British Columbia's salmon canneries will not only be much larger than the 1944 pack but it will exceed 1943 output by more than 475,000 cases. With drop in production, the dollar return from 1944 canning showed a decrease of a couple of hundred thousand dollars. On the other hand, there was a gain of \$600,000 in the return from sales of fresh and frozen salmon and a gain of over \$400,000 in the business in mild-cured salmon. The quantity of mild-cured salmon marketed was well over twice as great as in 1943.

*British Columbia Herring Operations*—Although herring are taken on both coasts the bigger part of the Canadian catch comes from British Columbia waters, or, in 1944, 182,795,000 pounds as against 97,645,000 pounds landed by Maritime Province fishermen. (Quebec landings for the year were about 32,600,000 pounds.) British Columbia continued to be the big source of canned herring, put up for delivery to the British Food Ministry. Actually the pack was smaller than in 1943 but, nevertheless, exceeded 1,130,500 cases and when it is pointed out that in 1938 the pack was under 24,000 cases it will be seen how tremendously wartime operations were expanded to meet United Nations' needs. If cannery output decreased in 1944 the production of herring meal and oil in British Columbia showed increase, with oil totalling over 8,200,000 gallons and meal 8,830 tons. Only small quantities of these herring by-products are manufactured elsewhere in Canada.

*The Cod Fishery*—Cod fishing is of top ranking importance on the Atlantic coast but relatively unimportant in British Columbia. Out of landings totalling nearly 186,500,000 pounds made by Maritime Province and Pacific Coast fishermen in 1944 all save 942,000 pounds came from waters off Nova Scotia, New Brunswick, and Prince Edward Island. In marketed value the fish were worth \$11,975,500, an increase of \$2,000,000 and more over the 1943 return. Quebec added roughly 50,000,000 pounds to the catch aggregate. However, Quebec landings were smaller than in 1943, and with the decrease in that province set off against the increase elsewhere the net gain in Canada's cod production for the year was about 20,900,000 pounds. Actually, the credit for this net gain belongs to Nova Scotia, always the source of much the greater part of the Dominion's cod production, where the year's catch was not far below 166,000,000 pounds, as compared with less than 136,900,000 in the year before. In New Brunswick, Prince Edward Island, and British Columbia there were reductions.

Much of the cod catch always goes into the fresh-and-frozen trade, much to the dried fish markets, smaller quantities are smoked or canned. The 1944 marketing included substantial shipments of frozen fillets to the British Food Ministry. Production of dried salt cod, including dried boneless, showed fairly sharp increase in the Maritimes, exceeding 17,300,000 pounds or 3,400,000 pounds more than in the preceding year. No dried fish is packed in British Columbia.

*Lobster Production*—Canada's lobster fishery, entirely in Atlantic waters, is much the most important lobster fishery in the world, with the bulk of the



annual catch being taken by Maritime Province fishermen but with Quebec also having substantial landings to its credit. In 1944 lobster fishing was good. All told, the lobstermen of Nova Scotia, New Brunswick, and Prince Edward Island landed 30,918,000 pounds or over 2,700,000 pounds more than in 1943. With prices firm, this catch brought the fishermen nearly \$6,900,000 in landed value and was worth more than \$8,524,000 on the market. The pack of canned lobster in the three provinces was 59,050 cases, 2,000 or so more than in the year before. More detailed reference to canned lobster production will be found in the report of the Department's Chief Supervisor (Eastern), Appendix No. 2. Shipments of live lobsters exceeded 16,351,000 pounds, an increase of nearly 280,000 pounds. They went mainly to the United States which, since war halted British importation of canned lobster, has also become the market for the great bulk of the Dominion's lobster cannery output.

By provinces, the catch in the Maritimes, its landed value, and its marketed value were as follows, stated in round figures:—

	<i>Catch Cwts.</i>	<i>Landed Value \$</i>	<i>Marketed Value \$</i>
Nova Scotia .....	171,410	4,173,600a	3,759,100a
New Brunswick .....	72,000	1,611,600	3,429,600
Prince Edward Island .....	65,780	1,149,700	1,335,500

Quebec catch and landed value: Approx. 22,100 cwts. and \$371,800.

<sup>a</sup> Certain quantities from the Nova Scotia catch were not marketed direct from Nova Scotia but entered into inter-shipments which were marketed from the other provinces. This explains why Nova Scotia "Marketed Value" appears as lower than "Landed Value". It is not uncommon for inter-shipments to create seeming discrepancies of this kind.

#### COMMERCIAL FRESHWATER FISHERIES

Landings of commercial freshwater fish decreased in 1944 and there was decrease, too, both in landed and marketed value. Saskatchewan and Alberta were the two provinces to show gain on all three sides of the account. There were also gains all 'round in the Yukon Territory but commercial fishing in Yukon waters is small-scale and changes in its results do not affect the over-all freshwater figures very much. Ontario had catch gain to its credit but was less fortunate as regards landed and marketed values. Quebec's poundage and dollar figures were smaller than in 1943, and so, too, the New Brunswick figures but commercial freshwater fishing in the latter province is limited. There was sharp reduction in catch and value totals in Manitoba where landings fell off in most of the principal fisheries, such as those for whitefish, tullibees, pike-perch or pickerel, and saugers.

Among the freshwater fish the whitefish continued at the top of the list in aggregate marketed value, and Saskatchewan, by the way, again in first place among the provinces as a whitefish producer, though a few years ago several others had ranked above it in this respect. Whitefish marketed value for the Dominion was \$3,501,500, not quite as much as in 1943. Pickerel, \$2,220,000, ranked second, with some increase to its credit. Next in order in the upper bracket came Lake trout, Blue pickerel, and saugers but none of them made as good a showing as in the preceding year.

Freshwater catch and marketed value for the year is set out, by provinces, in the following table, together with value increases or decreases as compared with 1943 results:—

	<i>*Catch Cwts.</i>	<i>*Value \$</i>	<i>*Increase or Decrease \$</i>
Ontario .....	310,400	4,938,200	—354,100
Manitoba .....	293,200	3,581,800	—982,800
Saskatchewan .....	129,600	1,482,200	+327,700
Alberta .....	76,300	929,900	+134,900
Quebec .....	48,600	362,700	—442,600
New Brunswick .....	4,712	27,500	— 5,100
Yukon .....	281	3,100	+ 600

\* Round figures used.

## FISHERIES EXPORT BUSINESS

All previous records in Canadian export trade in fisheries products went by the board in 1944. The business amounted, all told, to \$68,642,000, roundly stated, or very nearly \$8,330,000 more than in 1943. The major gain, \$5,160,000 (again using round figures, as will be done throughout these trade paragraphs), was in the exportation to the United States. Shipments to the United Kingdom showed an increase of close to \$654,000 and amounted to \$18,331,000. Exports to countries other than Britain and the United States totalled \$8,611,000 and were greater by \$2,515,000 than in the preceding year.

Exports of fresh and frozen fish led all groups of fisheries products in aggregate value, with shipments of canned fish and shellfish ranking second, and shipments of dried, pickled and smoked fish third. In the case of all three of these product classifications the business was greater than in 1943. Trade in marine oils, nearly \$4,774,000, increased by more than \$1,600,000, with roughly three-quarters of the sales being made to the United States. Miscellaneous minor products added approximately \$700,000 to the export total—not a large sum, of course, but well over twice the value of similar products sent to external markets in the year before.

So far as fresh and frozen fish are concerned, the normal condition is that the great bulk of Canada's exports of this kind go to the United States, and in this regard 1944 was a normal year, no matter how abnormal in some other respects. In the total exportation of products in the fresh-and-frozen class, \$31,478,000, the sales to the United States represented over \$27,754,000. However, the increase in these sales, as compared with the value of the business done with the United States in 1943, was under \$1,300,000 while supplies sent Great Britain showed an increase of twice that, with something to spare. The supplies sent Britain consisted almost wholly of frozen cod, pollock, and flatfish from the Atlantic coast and halibut and flatfish from British Columbia, all made available to the British Ministry of Food under agreements between Ottawa and London. Small trade with some countries other than Britain and the United States added a trifle to the increase side of the year's account, and aggregate gain in external business in fresh-and-frozen came close to \$3,957,000.

Canned fish and shellfish sent out of the country during the year were valued at \$21,233,000, not a great deal more, \$260,500, than in 1943. Most of the shipments went to the United Kingdom but there was a value decrease here of \$2,300,000, a state of affairs explained by a reduction in the quantities of canned salmon and canned herring delivered to Britain in the course of the year. Sales to the United States amounted to \$3,641,000, with canned lobster alone accounting for \$3,064,000 of the aggregate. The annual business with the United States in canned lobster—it was \$2,240,000 in 1943—traces back to the plan put into effect by the Department, early in the war, to develop North American outlets for the output of the Atlantic Coast lobster canneries which had previously marketed the great bulk of their production in Britain but could no longer do so under wartime conditions. Although much the larger part of the 1944 export business in canned products was with Great Britain and the United States, sales to other countries totalled \$4,067,000, a 50 per cent gain and better.

In the case of cured fish (salted, smoked, pickled) more than half of the year's trade, or \$5,985,000 out of \$10,459,000, was with the United States. Exportation to Britain was only small, under \$395,000, but the British people have never been large users of Canadian cured fish products. A business of nearly \$4,080,000 was done in these commodities with countries other than the United Kingdom and United States, principally West Indian areas. The overall increase in export trade in products in this group was only slightly less than \$2,050,000.

## INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

During the year 1944 the major interest of the Commission, which was established under the 1937 sockeye salmon treaty between Canada and the United States, continued to relate to the numerous obstructions to salmon migration existing in the Fraser River system, and to means of removing or overcoming them. (References to the earlier work of the Commission will be found in previous departmental reports). On April 1, 1944, the sum of \$1,000,000 was made available to the Commission by the Government of each country for use in connection with the improvement of conditions affecting migration in the Fraser system. Obstruction at Hell's Gate Canyon presented the prime problem requiring attention. It had been under continued intensive study by Commission biologists and engineers. Based upon the results of these studies, plans had been prepared for constructing fishways through the rocky walls of the canyon on either side of the river so that salmon seeking to make their way to the upstream spawning areas might surmount the obstructive condition which at certain water levels at Hell's Gate prevent the passage of fish. The plans provided for a fishway about 500 feet long on one side of the river and a second of 200 feet on the other side.

Early in July, 1944, tenders for the work were invited by public advertisement both in the Dominion and in the United States. A number were received and they were opened at the Commission's New Westminster offices in early August. Shortly afterwards the contract was awarded to the Coast Construction Company, Limited, of Vancouver. The company began work at Hell's Gate later in August and it is expected that the fishways will be in operation at the time of the 1945 sockeye run to the Fraser. Cost of the undertaking will be shared equally by the two countries.

The next major obstruction to be considered will be Bridge River Rapids where considerable difficulty is encountered by migrating sockeye. Biological investigations at the Rapids have continued over several seasons and engineering studies were commenced in 1944. Farwell Canyon, a point of difficult passage for salmon migrating up the Chilcotin River to the Chilko spawning grounds, is likewise being studied, as are the Skookumchuck Rapids on the Lower Lillooet River.

The total estimated spawning escapement of sockeye to the major streams of the Fraser River watershed for 1944 was 421,858 fish, as compared with 762,886 for the brood year, 1940. In other words, the spawning escapement for 1944 was only 51.4 per cent as great as that for the brood year.

The following table shows the percentages of the total sockeye escapement reaching each of the six most important spawning areas for each of the two years in question. A decrease in the percentages reaching Cultus Lake and Harrison River Rapids in 1944 and an increase in the same year for the Birkenhead River should be noted.

Stream	Per Cent of Total	
	1940	1944
Chilko River and Lake.....	71.4	71.1
Harrison River Rapids.....	5.7	0.02
Cultus Lake.....	9.7	3.4
Birkenhead River.....	3.6	13.7
Weaver Creek.....	2.2	3.9
Big Silver Creek.....	1.3	1.2
Other Streams.....	6.1	6.7

The report of the Commission for 1944 contains special reports on the engineering investigation at Hell's Gate, scientific management of the Fraser River sockeye, sockeye salmon tagging at Salmon Banks, Iceberg Point, Lummi



Island, and the Sand Heads, yield statistics of the sockeye fishery of the Fraser River, and sockeye catch statistics for the Indian fishery of the Fraser River watershed.

The commissioners met three times during the year. At the first meeting, held in Chicago on June 10 and 11, plans, schedules, and specifications for the Hell's Gate fishways were studied. At the second meeting, held in Vancouver on August 3-6, tenders submitted by various bidders were considered and the contract awarded. At the other meeting, held at Vancouver on December 4 and 5, the Hell's Gate project was discussed with representatives of the contractor. At this meeting some of the work of the past field season was also outlined by members of the scientific staff.

### INTERNATIONAL FISHERIES COMMISSION, 1944

Under authority of the treaty of January 29, 1937, between Canada and the United States, the International Fisheries Commission continued in 1944 to regulate the Pacific halibut fishery and to carry forward the investigations of the condition and trends of the fishery upon which regulation is based.

Regulations for the halibut fishery in 1944, issued on March 20, were basically the same as the regulations of the previous year. They contained only a few noteworthy changes. These were designed to obtain the maximum annual catch justified by the condition of the stocks of fish, to reduce illegal fishing prior to the opening of the fishing season and to give additional protection to the small halibut upon which the future of the fishery depends.

The regulations continued the Area 3 catch limit of 27,500,000 pounds but increased the catch limit for Area 2, which includes the grounds off the coast of British Columbia, from 23,000,000 to 23,500,000 pounds. They substituted a minimum length limit of 26 inches for halibut with heads on for the previously used minimum weight limit of 5 pounds 13 ounces for dressed halibut with heads on. They limited the pre-season validation of halibut licences for fishing in Areas 1 and 2 and in Areas 3 and 4 to three and five days, respectively, before the opening of the fishing season. They prohibited in all areas the use of dory gear, previously prohibited only in Areas 1 and 2, and extended the provision of the regulations prohibiting the retention of halibut caught by set nets to include halibut caught by all types of nets.

The fishing season began in all areas on April 16 as in the previous year but, because of a dispute over prices, little fishing was done until approximately May 23. The catch limit for Area 2 was attained and Areas 1 and 2, which include all fishing grounds south of Cape Spencer, Alaska, were closed to fishing at midnight of July 9. Areas 3 and 4, comprising all grounds north and west of Cape Spencer, were closed at midnight November 30, the beginning of the statutory closed season. Permits for the retention and landing of halibut caught incidentally during fishing for other species in areas closed to halibut fishing also became invalid on November 30.

Control of the size and frequency of landings, which the fishermen instituted some years earlier as a means of spreading the catch over a longer season, was discontinued entirely. The resultant increase in the size of trips and in the frequency of landings, in conjunction with an increase in the number of vessels fishing in Area 2, reduced the Area 2 fishing season to 48 days, the shortest in the history of the fishery. In Area 3 the effect of the larger and more frequent trips was more than counterbalanced by the diversion of vessels to the shark and tuna fisheries. As a result the Area 3 catch limit was not attained by the beginning of the winter closed season.

Landings of halibut on the Pacific Coast during 1944 amounted to 52,935,000 pounds, approximately 700,000 pounds less than in 1943. The decrease was caused by the failure of the fishing fleet to catch the Area 3 limit before the



winter closed season. Landings from Area 1, which extends south from Willapa Harbour, Washington, amounted to 463,000 pounds. Area 2, which lies between Willapa Harbour and Cape Spencer, Alaska, produced 25,616,000 pounds, including 845,000 pounds landed under permit after the closure of that area to regular halibut fishing. Area 3, lying between Cape Spencer and the Aleutian Islands, produced 26,856,000 pounds. No halibut were landed from Area 4, in the Aleutian Islands and Bering Sea region.

The halibut catch of Canadian vessels amounted to 13,308,000 pounds, which was 401,000 pounds greater than in 1943. Of this total 11,077,000 pounds were caught in Area 2 and 2,231,000 pounds in Area 3. Landings of United States vessels at Canadian ports were about 6,874,000 pounds less than in 1943, because of wartime price and operating conditions which made it more profitable for such vessels to land at Alaskan ports.

The Commission's program of statistical and biological investigations, which provide a factual basis for regulation, was continued as well as wartime conditions permitted. Changes in the fishery were observed and changes in the condition of the stocks of halibut were measured to determine the success of past regulations.

The abundance of halibut, as indicated by the average catch per unit of fishing effort, showed further improvement. The average catch per set of standard unit of gear was 15 per cent higher in Area 2 and 13 per cent higher in Area 3 than during the preceding year. The catch per unit of effort was 143 per cent and 133 per cent greater in Areas 2 and 3, respectively, than it was in 1930 when the abundance of halibut reached an all-time low because of overfishing.

The changes taking place in the composition of the stocks of adult halibut as a result of regulation were studied by sampling the catches of commercial fishing vessels. Approximately 21,000 fish were measured and materials for the determination of age were collected from 3,500 of these. The samples were mainly from Area 2 catches, as abnormalities in the distribution of landings made it difficult to secure samples from Area 3.

Analysis of the length samples showed that the improvement in the catch per unit of effort in Area 2 during 1944 was caused, as in 1943, mainly by an increase in the abundance of halibut of the small commercial sizes. These small fish were present in greater numbers than in 1943 and were somewhat larger in average size as a result of the additional year's growth. A small increase in the abundance of halibut of the larger sizes was also apparent.

Age composition studies, which indicate the time of origin of the changes occurring in the stocks of fish, were carried forward on a very limited scale, using age materials secured from the commercial catch. Only sufficient work was done to show that the small fish, which contributed so much to the catches in 1944, were derived predominantly from spawnings seven and eight years earlier.

Although results of the analysis of spawning materials collected in the winter of 1942-43 were outlined in the annual report of the Commission's 1943 activities, mention of the vessel operations by which those materials were collected was inadvertently omitted. In that winter a vessel was chartered from late December to the end of February and was operated in the vicinity of the Cape St. James spawning grounds at the southern end of the Queen Charlotte Islands in Area 2. During the charter period, 83 quantitative net hauls were made at 38 stations to determine the abundance of eggs and larvae produced. Operations were seriously hampered by unusually bad weather and by blackout regulations which practically eliminated night work.

Investigations of the success of spawning, such as those conducted at sea in Area 2 each winter from 1933-34 to 1942-43, were not undertaken in the winter of 1943-44 because of wartime restrictions which prevented the continuous day and night vessel operations that experience had shown to be necessary to

secure adequate coverage of the spawning grounds. The restrictions were relaxed later in the year and preparations for a resumption of the investigations were under way as the year ended.

The temporary suspension of spawning investigations at sea made it possible to undertake more detailed analyses of the spawning data collected during the previous nine years and to begin the organization of this material for publication. Results of the analysis indicated that it may be possible to determine the success of spawning in the Cape St. James section of Area 2 with less expenditure of time and effort than heretofore.

The Commission's investigations proved that the condition of the stocks of halibut in Areas 2 and 3 was continuing to improve under regulation. They showed that the size of the stocks and the yield therefrom could be still further increased by continued rational control.

Meetings of the Commission were held at Seattle, Washington, on November 27, 28 and 29, to consider petitions which had been received to examine the effect of regulation upon the condition of the stocks of halibut and to decide upon regulations for 1945.

As in previous years, the Commission maintained close contact with the fishing industry. On November 27 it met with representatives of the Otter Trawlers' Union, Seattle, to receive representations concerning the Commission's prohibition of the use of nets in the halibut fishery. On November 28 it met with the Halibut Conference Board, composed of representatives of the halibut fishing fleets of Alaska, British Columbia and Washington. At this conference the results of the Commission's investigations and the effect of regulations upon the condition of the stocks of halibut were reviewed and recommendations for the regulations of the fishery in 1945 were received and discussed.

Members of the Commission were: Mr. G. W. Nickerson and Mr. A. J. Whitmore, for Canada; and Mr. Edward W. Allen and Mr. Charles E. Jackson, for the United States. Mr. Nickerson and Mr. Allen served as Chairman and Secretary, respectively.

### FUR SEAL RETURNS

Revenue accruing to Canada from sales of Pribilof Island sealskins in the fiscal year 1944-45 amounted in all to \$374,743.20. Over against this return were expenses of \$191,458.67, chargeable to the appropriation voted by Parliament to take care of processing costs, freight, etc., in connection with sealskin transactions. Of the total revenue \$282,101 was the net return from the sale of 3,977 pelts marketed at fur auctions in Montreal for the Department of Fisheries, which handles fur seal matters for the Government. Another \$91,238 represented Canada's share of the proceeds from sales made by the United States Government at St. Louis, Missouri. The skins sold at St. Louis had all been processed there. Some of the pelts auctioned at Montreal had also been processed on Canada's order at St. Louis and then brought into this country for disposal. Most of the skins sold in the Dominion, however, had been dressed and dyed in London, England. At one time it was Canada's practice to have all the Pribilof skins to which it was entitled under the former Pelagic Sealing Treaty marketed with United States pelts in St. Louis and to receive payment of its share of the return from the Washington Government. Later, the Dominion changed the plan and sent its annual share of skins to London for processing and sale. Still later, another change was made and Canadian skins, though sent to London for processing, were brought back to this country for marketing. Wartime conditions dislocated some of these arrangements, however, and at present some of the skins entering into the Canadian share of the take are processed and sold in St. Louis, some are processed at St. Louis and sold in this country, some are processed in England and returned to the Dominion for sale.

Canada now shares in the annual take of skins from the Pribilof rookeries under a Provisional Sealing Agreement between this country and the United States. All seal hunting at the rookeries is carried on by the United States authorities and the Dominion is entitled each year to 20 per cent of the total number of pelts taken. Formerly, under the Pelagic Sealing Treaty, 1911, between Great Britain, United States, Russia and Japan, the Canadian share was 15 per cent. That treaty ceased to be operative in 1941 and Ottawa and Washington then entered into the present provisional arrangement.

During the 1944 sealing season at the Pribilofs only 47,652 skins were taken as compared with 117,164 in 1943. On the surface, this great reduction may seem surprising and, indeed, might be regarded as suggesting a sudden and a serious diminution in the size of the seal herd. As a matter of fact, however, the very large take in 1943 was due to exceptional conditions, and the drop in 1944 to a take of less than average size was likewise due to exceptional conditions, but conditions of an altogether different character from those which affected the figures for the preceding year. As for the 1943 take: The usual practice in Pribilof sealing is to kill only the surplus three-year-old males of each season but in 1942 certain war factors had prevented any sealing whatever and the three-year-olds went free; when it was possible to resume hunting in 1943 the males in both the three-year and four-year classes were taken and, consequently, there was a big jump in the season's total kill. In 1944, on the other hand, weather conditions apparently tended to keep a substantial number of the younger male seals off the rookeries until late in the season when the most favourable time for taking the skins had passed, and the number of pelts obtained was consequently smaller than might normally have been expected.

## FISH CULTURE—OYSTER CULTURE

Appendix No. 3 deals with the department's fish cultural operations for the year in the three Maritime Provinces where the fisheries are mainly under Dominion administration. Under the fish culture branch 13 main hatcheries, 5 rearing stations, 6 retaining ponds, and several camps for egg collection purposes, were operated. All told, the total output from these establishments was 18,501,600. Three-quarters and more of the output were distributed in the fledgling and older stages.

A review of the year's work in connection with oyster culture will be found in Appendix 4.

## FISHING BOUNTY

In the following table details are given as to the distribution of fishing bounty on the Atlantic coast for the 1944 season when 19,709 fishermen and the owners of 9,715 fishing boats and vessels shared in the total payments of \$158,232. Fishing bounty payments are made under authority of "An Act to Encourage the Developing of Deep-sea Fisheries and the Building of Fishing Vessels."

The basis of distribution varies slightly from year to year, according to the number of claimants eligible to share in a bounty total of \$160,000. For 1944 the basis of distribution was as follows: To owners of fishing boats of not less than 12-foot keel, \$1 per boat; to boat fishermen entitled to bounty, \$7,159; to eligible vessel owners \$1 per registered ton, the maximum payment in the case of any one vessel, \$80; to vessel fishermen entitled to bounty, \$7.60 each. On this basis 8,892 boats and their crews received, all told, \$117,854, in even figures, and 823 vessels and their crews to \$40,377.



Distribution details were as follows:—

Province and County	Boats	Men	Amount	Vessels	Tons	Average Tons	Men	Amount	Total Amount
			\$ cts.					\$ cts.	\$ cts.
<i>Nova Scotia—</i>									
Annapolis.....	159	258	2,004 20	.....	.....	.....	.....	.....	2,004 20
Antigonish.....	120	172	1,349 80	.....	.....	.....	.....	.....	1,349 80
Cape Breton.....	213	359	2,780 10	69	921	15	253	2,843 80	5,623 90
Digby.....	267	440	3,413 50	33	435	13	74	998 00	4,411 50
Guysborough.....	508	790	6,156 50	37	406	13	115	1,280 00	7,436 50
Halifax.....	710	975	7,681 75	33	659	20	182	2,042 80	9,724 55
Inverness.....	318	542	4,195 30	16	176	11	96	905 60	5,100 90
Kings.....	58	65	522 75	.....	.....	.....	.....	.....	522 75
Lunenburg.....	628	734	5,877 60	46	2,356	51	788	8,345 10	14,222 70
Pictou.....	20	34	263 10	.....	.....	.....	.....	.....	263 10
Queens.....	141	223	1,735 45	16	211	13	44	545 40	2,280 85
Richmond.....	344	624	4,806 10	14	161	12	41	472 60	5,278 70
Shelburne.....	482	773	6,009 95	118	1,519	13	376	4,376 90	10,386 85
Victoria.....	221	365	2,831 50	13	158	12	44	492 40	3,323 90
Yarmouth.....	93	185	1,415 75	79	1,043	13	213	2,662 70	4,078 45
Cumberland.....	1	1	7 15	.....	.....	.....	.....	.....	7 15
Totals.....	4,283	6,540	5,050 50	474	8,045	17	2,226	24,965 30	76,015 80
<i>New Brunswick—</i>									
Charlotte.....	154	286	2,200 40	31	358	11	104	1,150 80	3,351 20
Gloucester.....	436	852	6,531 55	133	2,378	14	532	6,421 20	12,952 75
Kent.....	127	220	1,700 00	22	266	12	51	553 60	2,353 60
Northumberland.....	62	147	1,113 55	18	196	10	54	606 40	1,719 95
Restigouche.....	5	9	69 35	.....	.....	.....	.....	.....	69 35
St. John.....	15	24	186 60	.....	.....	.....	.....	.....	186 60
Westmorland.....	48	92	705 80	.....	.....	.....	.....	.....	705 80
Totals.....	847	1,630	12,507 25	204	3,198	15	741	8,832 00	21,339 25
<i>Prince Edward Island—</i>									
Kings.....	240	334	2,628 85	4	54	20	10	130 00	2,758 85
Prince.....	357	633	4,891 95	.....	.....	.....	.....	.....	4,891 95
Queens.....	137	249	1,914 35	.....	.....	.....	.....	.....	1,914 35
Totals.....	734	1,216	9,435 15	4	54	13	10	130 00	9,565 15
<i>Quebec—</i>									
Bonaventure.....	282	569	4,358 85	30	367	12	113	1,225 50	5,584 35
Gaspe.....	1,783	4,318	26,224 70	110	1,486	14	480	5,157 70	31,382 40
Matane.....	68	122	940 80	.....	.....	.....	.....	.....	940 80
Magdalen Island.....	212	504	3,816 35	1	29	29	5	67 00	3,883 35
Saguenay.....	683	1,235	9,521 00	.....	.....	.....	.....	.....	9,521 00
Totals.....	3,028	6,748	44,861 70	141	1,882	13	598	6,450 20	51,311 90
Grand Totals.....	8,892	16,134	117,854 60	823	13,179	16	3,575	40,377 50	158,232 10

NOTE.—A number of "late" claims amounting in all to \$1,706.80 and which are included in this statement, are for the season of 1943. As the basis of distribution for 1943 differed from that of 1944 a number of figures in the "amount" columns do not, as a result, balance with the number of claims paid.

## PRAIRIE WHITEFISH INSPECTION

One of the important new steps taken during the year was the establishment of a system of whitefish inspection in the Prairie Provinces under joint arrangements made by the federal authorities and the three provinces. The system was set up with a view to overcoming certain difficulties in whitefish marketing, the most important single branch of Prairie fisheries trade, a branch which consists mainly in exportation to the United States. The inspection plan became operative in November, 1944, the beginning of the winter fishing season in Prairie areas, under regulations authorized by the federal Fish Inspection Act. This is the first time any such scheme has been brought into effect by joint federal-provincial action. Experience will no doubt show the need for this or that improvement in the inspection procedure but results so far indicate that the system will be of a good deal of benefit.

Creation of the system followed several conferences between federal fisheries authorities and those of the provinces concerned. At these conferences, which



had been preceded by a fact-finding investigation of the marketing situation, there was unanimous agreement that action needed to be taken and no great difficulty was experienced in deciding upon the general principles to be followed. Details of the plan which were worked out in these and later discussions need not be gone into very fully here. Briefly, the plan provides, first, for surveys of whitefish producing waters to determine their suitability as sources of market supply and, second, the further examination by inspecting officers as may be necessary of whitefish shipments sent out of any of the three provinces. (With the probable development of some commercial fishing in the Northwest Territories in mind the regulations will also be applicable in those areas as need arises). The surveys of whitefish waters are carried out by provincial officers who follow a uniform procedure suggested by fisheries scientists. Inspection of shipments is directed by a federal officer, known as Chief Inspector. Working with him as whitefish inspectors are provincial fisheries officers who, for this particular work, have the status of federal officials. No whitefish shipment may be moved from a Prairie province unless it bears either a certificate issued and signed by an authorized inspecting officer or an "identity tag". Certificates are of two kinds—one, bearing the words "Inspected Whitefish" are given in the case of fish which were of approved quality as caught, the second, marked "Inspected Processed Whitefish", is for fish which have been brought to proper level of quality by filleting or other means of processing. The identity tags are for shipments from waters which have not been surveyed in accordance with the regulations. Whitefish in this category are marked by the officers as "Non-Inspected Whitefish". Issuance of identity tags is a temporary measure and they will disappear when the work of surveying all the Prairie whitefish waters is completed. The more important lakes have already been surveyed but a number of other waters remain to be examined.

D. B. FINN,  
*Deputy Minister.*

#### APPENDIX No. 1

### ANNUAL REPORT OF CHIEF SUPERVISOR OF FISHERIES (MAJOR J. A. MOTHERWELL), WESTERN DIVISION (BRITISH COLUMBIA), FOR 1944

Total value of the fisheries of the province for the year amounted to \$34,903,064, compared with \$32,477,964 in 1943, \$38,059,559 in 1942, and an average of \$15,628,534 during the ten-year period 1930 to 1939.

The principal items making up the total for 1944 are:

Salmon .....	\$15,623,204
Herring .....	6,758,625
Fish livers and viscera .....	4,770,825
Halibut .....	2,934,885
Pilchards .....	2,222,181

#### SALMON

The pack of all varieties of salmon totalled 1,097,557½ cases, compared with 1,258,221½ cases for the previous year, and an average of 1,585,999 cases over the last five seasons. The average total salmon packs for the province since 1925 are given in the following statement:

1925-1929 .....	1,716,456 cases
1930-1934 .....	1,367,179 cases
1935-1939 .....	1,633,102 cases
1940-1944 .....	1,585,999 cases

Whilst 1944 was not expected to produce a large pack of salmon, in view of brood-year conditions on the spawning grounds in the case of several of the varieties, yet the final total was considerably below expectations. The packs were particularly disappointing in the case of chums and cohoes. The condition of the spawning grounds in the brood years, in the case of these two varieties, justified the expectation of very considerably larger returns, but for unknown reasons the runs to the streams in the lower part of the province, particularly in the case of chums, could almost be classed as a failure. Primarily for the purpose of assuring that a satisfactory percentage of the returning salmon to the Fraser River system would reach their spawning grounds an extra 24-hour weekly close period was enforced in District No. 1 (Fraser River Area), and in Johnstone Straits where the Fraser runs are intensively fished by purse-seines. In addition, in Districts Nos. 1 and 3 all salmon fishing by means of nets was closed on November 3rd instead of being permitted until the legal closing time of November 30th. As a result of these extra measures no doubt a larger percentage of the runs did succeed in passing to the spawning grounds, but the several species were still not sufficiently numerous to provide a satisfactory seeding of the Fraser watershed or in the fall salmon streams in the southern part of the province, including Vancouver Island.

The fishery officers advised that, particularly in the northern areas, there was a lack of energy on the part of the salmon gill-net fishermen in commencing operations. One factor was the more attractive grayfish operations in the vicinity of the Queen Charlotte Islands and along the West Coast of Vancouver Island.

#### SOCKEYE

The total canned pack of 247,714 cases, whilst exceeding that of the previous year, when the total reached 164,889 cases, compares very unfavourably with the preceding five year average of 380,175 cases, as shown below:

1925-1929 .....	304,503 cases
1930-1934 .....	337,897 cases
1935-1939 .....	361,716 cases
1940-1944 .....	380,175 cases

*Naas River Area.*—The total of 13,318 cases compares with 24,425 cases in 1939 and 13,810 cases in 1940, the two brood years. The number of gill-net fishing boats operating was 186 compared with 289 in 1939 and 254 in 1940.

The escapement to the spawning grounds is reported as satisfactory.

*Skeena River Area.*—The pack of 67,855 cases compares with 68,388 in 1939 and 116,505 in 1940. There were 725 gill-net boats operating in 1944 compared with 844 in 1939 and 926 in 1940.

The escapement to the spawning grounds is reported as good.

The local inspector states that two salmon traps operating on the Alaska side of the international boundary and close to it caught 44,000 sockeye in the last week of July. In view of the fact that the Naas and Skeena are the only sockeye streams in the vicinity, and that tagging operations in the past have shown that in the fishing operations in Alaskan waters sockeye heading for Canadian streams are taken, there appears to be no doubt that the salmon included in this large catch were on their way to Canadian streams.

*Rivers and Smiths Inlets.*—The combined pack of these two areas totalled 40,859½ cases, compared with 71,068 in 1939 and 89,142 in 1940. In the year under review 1,090 gill-net boats operated, compared with 1,817 in 1939 and 1,896 in 1940.

The escapement to the spawning grounds is reported as being light.

In 1939 severe freshets occurred in the Smiths and Rivers Inlet watersheds, resulting in spawning streams being washed out and large quantities of eggs

destroyed. Suspected damage has been confirmed by the lack of four year old fish returning in 1943 and five year fish in 1944. At Smiths Inlet the 1944 cycle is a small one, in any event, and no large return was expected. To assure of a larger percentage of escapement to the spawning grounds the fishing boundary was lowered in such a manner as to cut off approximately four and one-half miles where in the past as many as 70 gill-net fishermen have operated. It is estimated this particular area in the past has produced about one-third of the total sockeye catch in the Smiths Inlet subdistrict.

*Fraser River Area.*—Apart from the run to the Chilco watershed, this area was expected to show a very poor return of sockeye but, actually, the pack was 85,656½ cases as against 86,215 cases in the brood year, 1940. There were 2,582 gill-net boats licensed to operate in 1944, compared with 2,237 in 1940.

Examination of the spawning grounds bore out the expectation that the Chilco area would probably produce the very large percentage of the pack, as it was only in this area that the spawning was good.

It is interesting to note, in connection with the sockeye runs to the Fraser River watershed, that two of the cycles out of the four have built up quite rapidly in the last 20 years. These are the runs to Chilco and Shuswap areas.

In the Chilco area the following conditions have been found on the spawning grounds.

- 1928—Reported as the best in fourteen years, although a count was not made.
- 1932—70,000 spawning sockeye estimated.
- 1936—74,000 spawning sockeye estimated.
- 1940—350,000 spawning sockeye estimated.
- 1944—350,000 spawning sockeye estimated.

In the Shuswap area spawning conditions were as follows:—

- 1922—Estimated from 20,000 to 25,000 sockeye on the spawning grounds.
- 1926—500,000 to 800,000.
- 1930—Increase over 1926.
- 1934—25 per cent increase over 1930.
- 1938—Estimated approximately 2,000,000 sockeye.
- 1942—Estimated at well over 2,000,000 sockeye.

In each year of the two cycles mentioned, extra conservation measures were enforced in the areas through which the salmon runs passed to the spawning grounds of the Fraser watershed. Evidently conditions at Hell's Gate were satisfactory for the safe passage of the fish.

As the sockeye running to the Fraser River are predominantly four year fish it will be appreciated that it requires four or five cycles to show definitely the results of any unusual measures taken for the purpose of increasing runs. The experience with the two cycles mentioned above illustrates what can be done, as well as the fact that a good many years are required to produce results. What has already been accomplished by the Department in the Chilco and Shuswap areas justifies the expectation that the operations of the International Pacific Salmon Fisheries Commission will restore the runs in the Fraser to their original state of productivity.

#### COHOES

The year's total of 169,082½ cases compares with 361,380 cases canned in the brood year of 1941, and with 176,313 cases, the average of the preceding three years, as shown by the following statement:

	Cases
1930-1932 .....	128,635
1933-1935 .....	183,112
1936-1938 .....	200,007
1939-1941 .....	253,171
1942-1944 .....	176,313

The year's pack was definitely a disappointment and its size is not understood in view of the conditions found in the brood year of 1941.



## PINKS

The pack of 389,692 cases compares with 270,622½ cases in the brood year, 1942, and with 459,940 cases, the average of the last two year cycle, as shown by the following statement:

	Cases
1931-1932 .....	215,355
1933-1934 .....	483,461
1935-1936 .....	553,249
1937-1938 .....	493,226
1939-1940 .....	417,253
1941-1942 .....	349,194
1943-1944 .....	459,940

The exceptionally good run to the Bella Coola and Bella Bella areas was responsible for a large portion of the 1944 pack. This run was not unexpected by the fishery officers as the seeding in 1942 was unusually satisfactory in these areas.

## CHUMS

The total of 255,316½ cases was extremely disappointing in view of the excellent run in 1940 when 643,443 cases were packed. The average pack over the previous four years was 544,827 cases, as shown by the following statement:

	Cases
1925-1928 .....	683,808
1929-1932 .....	297,213
1933-1936 .....	453,476
1937-1940 .....	504,860
1941-1944 .....	544,827

Conditions on the spawning grounds in the brood year were very satisfactory, and the reason for the small return this year is not understood. One factor which would probably have some effect on the 1944 pack was the closing of all salmon net fishing in Districts Nos. 1 and 3 on November 3, for conservation purposes, instead of permitting operations to continue until the legal limit, November 30.

## SALMON--GENERAL

The number of sockeye salmon required to fill a case of 48 one-pound talls in the several more important gill-net areas during the season of 1944 was as follows:

Fraser River .....	12.31
Skeena River .....	12.71
Naas River .....	11.58
Rivers Inlet .....	15.00
Bella Coola .....	14.50
Butedale .....	14.70

## INSPECTION OF CANNED SALMON

Following are the detailed results of the year's inspection of canned salmon at the laboratory maintained by the Department, in Vancouver:

Number of inspections made .....	1,466
Total number of cases inspected .....	1,174,415
Total number of cases below certificate standard .....	12,977½
Total number of cases eligible for certificates .....	1,161,437½



## DETAILS OF CANNED SALMON INSPECTIONS ACCORDING TO SPECIES

Species	Number of cases inspected	Number of cases below certificate standard	Number of cases eligible for certificates
Sockeye.....	251,267	5,713½	245,553½
Springs.....	21,547	262	21,285
Steelheads.....	4,446½	3	4,443½
Bluebacks.....	12,491	242	12,249
Coho.....	187,748	1,598½	186,149½
Pinks.....	407,117	3,232	403,885
Chums.....	289,798½	1,926½	287,872
Totals.....	1,174,415	12,977½	1,161,437½

## PARTICULARS OF NON-CERTIFIED SALMON ACCORDING TO SPECIES

Species	Grade B	Tips and Tails	Minced, Flakes, etc.	Totals
Sockeye.....	729	2,476	2,508½	5,713½
Springs.....	100		162	262
Steelheads.....	3			3
Bluebacks.....			242	242
Coho.....	86	902½	610	1,598½
Pinks.....	2,777	426	29	3,232
Chums.....	1,820	77	29½	1,926½
Totals.....	5,515	3,881½	3,581	12,977½

None of the 1944 pack of salmon was graded as Below B.

The report of the Chief Chemist, covering the year's operations, at the laboratory, will be found as Appendix No. ....

Salmon inspection fees collected, at the rate of one-half cent per case, amounted to \$6,275.82.

## SALMON FOR UNITED KINGDOM

All of the 1944 salmon pack was made available to the British Ministry of Food or for other war services, with the exception of some 250,000 cases reserved for domestic consumption. The prices paid to the operators were those obtaining in the previous year. The actual distribution of the pack from 1941 to 1944 is shown below:

	1941	1942	1943	1944
	Cases	Cases	Cases	Cases
TOTAL PACK.....	2,248,870	1,812,254	1,255,508½	1,097,557½
<i>Distribution:</i>				
Canada.....	549,178½		200,000	250,000
Canadian Red Cross.....	17,599	49,851	50,000	52,000
Department of Munitions and Supply.....		14,227	50,000	20,000
Australia.....	37,112½			
South Africa.....	2,507½			
Other countries.....	10,140½			
B. W. Indies, Africa and Ships' Stores.....		52,620		
British West Indies.....			38,247	
Eastern Hemisphere.....			33,670	
L. F. C. Areas.....				147,112½
Sub-Grade Salmon.....	113,973½			
Samples, Culls, etc.....		2,402		
	730,511½	119,100	371,917	469,112½
Balance for the British Ministry of Food.....	1,518,358½	1,693,154	883,591½	628,445

SALMON TAKEN BY INDIANS OF THE PROVINCE FOR PURPOSES OF THEIR  
OWN FOOD SUPPLIES, UNDER FREE PERMIT

	Sockeye	Springs	Coho	Pinks	Chums	Steel- heads	Total
	(fish)	(fish)	(fish)	(fish)	(fish)	(fish)	(fish)
District No. 1.....	36,339	6,824	5,948	.....	3,844	1,468	54,423
District No. 2.....	93,538	3,775	17,440	20,400	17,175	3,433	155,761
District No. 3.....	13,520	4,815	7,500	8,369	55,833	311	90,348
Totals.....	143,397	15,414	30,888	28,769	76,852	5,212	300,532

SALVAGING OF SALMON FRY

Area	Method	Springs	Steel- heads	Cohoes	Chums	Total
<i>District No. 1—</i>						
Squamish Area.....	Netting.....	3,680	.....	1,750	.....	5,430
	Ditching.....	2,100	.....	1,000	.....	3,100
Chilliwack Area.....	Netting.....	.....	.....	.....	.....	.....
	Ditching.....	.....	.....	1,025	1,925	2,950
Totals.....	.....	5,780	.....	3,775	1,925	11,480
<i>District No. 3—</i>						
Victoria Area.....	Netting and ditching.....	.....	1,300	22,000	21,500	44,800
Alberni Area.....	".....	.....	.....	22,000	.....	22,000
Cowichan Area.....	".....	.....	.....	400	.....	400
Comox Area.....	".....	.....	.....	48,500	.....	48,500
Totals.....	.....	.....	1,300	92,900	21,500	115,700
Total for Province.....	.....	5,780	1,300	96,675	23,425	127,180

SLOAN TIMBER ENQUIRY

Advantage was taken of the Provincial Government Timber Enquiry, being conducted by the Honourable Mr. Justice Gordon McG. Sloan, to present a brief on behalf of the Department, calling the attention of the commissioner to the great damage done the salmon fisheries of the province as a result of logging operations. The more serious aspects of this matter are described as follows:

The *removal of the timber* and destruction of the forest floor along the streams and around the shores of the lakes causes a quick run-off after each rain, instead of the water being absorbed and held to run off gradually.

- (a) As the salmon eggs of the fall run species are normally deposited in the gravel of the stream beds during high water conditions the quick run-off leaves large quantities of them high and dry, resulting in their destruction.
- (b) There is so little water left in the streams that those young salmon which have been successfully hatched are stranded in holes or shallow channels and become an easy prey to their numerous enemies, such as gulls, ducks, and other forms of life, or later perish if the water dries up.
- (c) The burning of the slash also destroys the moss and top soil, leaving the gravel, which does not hold the water.
- (d) At the end of the summer when the adult salmon return for spawning purposes they are unable to ascend the streams through lack of water,

and either die unspawned in their attempt to reach the spawning grounds or express their eggs in brackish or salt water where they are destroyed.

- (e) There may be a trickle of water in the smaller streams which permits the adult salmon to ascend part way up the streams but the supply is so small as to allow eagles, ducks, gulls, and bears to destroy literally all adult salmon. This is particularly evident in some of the streams along the east coast of the Queen Charlotte Islands.

The *methods employed in logging* operations often result in the tearing up of roots and lodging them, together with brush and logs, in the salmon streams, where they form jams. This has the following results, is so far as the salmon are concerned:

- (a) Often prevents the ascent of the adult salmon to their spawning grounds.
- (b) Flood water is held back and the spawning grounds are covered to a depth which prevents the spawning of the salmon even if they do succeed in passing through the jams.
- (c) The log and brush jams often cause a stream to change its channel, after the salmon eggs have been deposited in the gravel, leaving large areas of gravel filled with salmon spawn, high and dry. These eggs are a total loss.

Some operators drag the logs down the beds of the streams as they sometimes find this practice more economical than building a railroad or truck road. The results of such operations are:

- (a) If spawning salmon are in the stream many of them are destroyed.
- (b) If the eggs have been expressed in the gravel by the salmon the logs destroy large quantities of them.
- (c) The logs gouge out the beds of the stream, removing the gravel and so destroying the spawning beds.

The following suggestions were offered as a means of correction of the situation:

- (1) Leave unlogged at least a half mile strip along the banks of each salmon stream, and around the edges of the lakes at the head of these streams, as well as the lake tributaries. This would be particularly effective in the case of the short streams emptying directly into the sea.

The difficulties and objections to such a suggestion are, of course, appreciated, yet it is felt that if this could be provided for it would go a long way towards helping the situation.

- (2) A comprehensive programme of reforestation.

Following the logging-off of the timber there would naturally be a considerable period before the new growth would be sufficient to rectify the situation but in streams which had not been totally destroyed from the standpoint of the salmon fisheries the reforestation would undoubtedly in time restore satisfactory conditions.

- (3) Make it a condition, with heavy penalties, of all licences issued to loggers, that no brush or logs be left in the streams and that no logs be dragged down the beds of streams. This would be of little value, however, unless strictly enforced.
- (4) Require logging operations by the selective method. In this way the underbrush and younger trees would be left and there would be no destruction of the moss and top soil by fire as is the case when the slash is burned.

- (5) Log off alternate blocks or patches and only cut the remainder when the logged-off portions are again covered with sufficient new growth to hold the water.

The varieties of salmon most greatly affected by the logging operations are those which spawn in the shorter streams near salt water. These are the pinks and chums, which, together, represent the largest portion of each season's catch.

#### HALIBUT

The halibut fishing season in Areas Nos. 2 and 3, under the regulations of the International Fisheries Commission, opened on April 16. Owing to dissatisfaction on the part of the United States fleet with the ceiling prices set by United States authorities, there was a delay of approximately one month in the commencement of fishing. The Canadian fleet supported the United States fishermen and remained in port until the dispute was finally settled. The result was that the Vancouver halibut fleet did not leave for the fishing grounds until midnight of May 19 and the Prince Rupert fleet at 10 a.m. on the 21. The intensive fishing in Area No. 2 caused the closing of that district on July 9, after only 51 days of operation, the shortest period on record. Owing to the fact that few of the boats of the Canadian fleet are capable of proceeding long distances from port the operations in Area No. 3 by Canadian fishermen were very limited. That area closed on November 30.

The total landings at British Columbia ports during the year, including those by United States vessels, amounted to 189,248 hundredweights, compared with 250,034 hundredweights during the previous year. The smaller total was due primarily to the decrease in landings by United States boats as a result of price conditions at the Canadian ports being less attractive than in previous seasons, compared with those obtainable in Alaska.

The following statement shows the landings annually in the several centres in the province, since 1930:

Year	Vancouver and New West- minster	Prince Rupert	Butedale- Namu Area	District No. 3	Totals
	cwts.	cwts.	cwts.	cwts.	cwts.
1930.....	11,387	293,617	978	2,814	308,796
1931.....	8,498	167,757	3,627	2,123	182,005
1932.....	11,883	148,615	6,677	1,672	168,847
1933.....	13,436	144,065	10,431	2,440	170,372
1934.....	16,113	150,476	13,297	2,716	182,602
1935.....	22,351	129,586	15,713	3,493	171,143
1936.....	20,777	131,830	11,522	3,992	168,121
1937.....	23,334	147,638	12,676	3,777	187,425
1938.....	28,155	141,691	17,776	5,866	193,488
1939.....	30,225	173,857	18,651	4,455	227,188
1940.....	26,010	185,921	23,157	3,955	239,043
1941.....	22,057	166,513	30,946	10,142	229,658
1942.....	30,547	180,789	21,638	10,941	243,915
1943.....	44,201	180,507	12,003	13,323	250,034
1944.....	30,779	133,744	12,356	12,369	189,248

#### HALIBUT FOR UNITED KINGDOM

During the year there was shipped to the United Kingdom for account of the British Ministry of Food, 1,361,226 pounds of frozen halibut.



## HERRING—GENERAL

The total tonnage of herring taken by fishermen during the year was 93,551·9 green tons, used as follows:

	District No. 1	District No. 2	District No. 3	Total	Green Tons
Catch.....cwt.	9,901	630,918	1,230,219	1,871,038	93,551·9
Production—					
Marketed fresh.....cwt.	3,101		1,862	4,963	248·15
Canned.....cases	903,948	17,470	208,859	1,130,277	45,211
Kipperd.....cwt.	3,546		33	3,579	536·85
Bloaterd.....cwt.	5		20	25	2·50
Pickled.....bbls.	353	428	1,562	2,343	351·45
Used as bait.....bbls.	15,480	16,258	11,791	43,529	4,352·90
Canned smoked fillets.....cases	250			250	17·50
Herring Meal.....tons	2,106·05	3,822·95	2,903	8,832	42,831·55
Herring Oil Imp gals.....gals.	332,095	238,388	318,730	889,213	
					93,551·90

All told, 1,130,277 cases of herring were canned during the year. It has been, however, only owing to the war-created demands that any considerable quantity of British Columbia herring has been placed in cans. The manner in which these operations have increased since the commencement of the war is shown by the following details:

Year	Cases
1939.....	233,046
1940.....	727,292
1941.....	1,013,329
1942.....	1,540,918
1943.....	1,372,775
1944.....	1,130,277

Considerable success was obtained in locating schools of herring by means of an echo-sounding device. Experiments in the first instance were made several years ago by members of the staff of the Biological Station at Nanaimo, which demonstrated the possibilities in this connection. The operators have received such encouragement from the results obtained to date that they have felt justified in installing this equipment in a number of boats recently built.

## HERRING INSPECTION

The following are the detailed results of the year's inspection of canned herring at the laboratory maintained by the Department, in Vancouver:

## CANNED HERRING INSPECTIONS FOR SEASON 1944-1945

Number of inspections made.....	478
Total number of cases inspected.....	1,221,037½
Total number of cases below certificate standard.....	1,675
Total number of cases eligible for certificates.....	1,219,362½

## DETAILS OF CANNED HERRING INSPECTIONS ACCORDING TO SIZES

	Plain			Tomato			Total
	Number of Cases Inspected	Number of Cases Below Certificate Standard	Number of Cases Eligible for Certificates	Number of Cases Inspected	Number of Cases Below Certificate Standard	Number of Cases Eligible for Certificates	
1 lb. talls.....	115,045	1,468	113,577	78,643		78,643	192,220
1 lb. ovals.....	822,029	207	821,822	117,719		117,719	939,541
½ lb. ovals.....				87,601½		87,601½	87,601½
Totals.....	937,074	1,675	935,399	283,963½		283,963½	1,219,362½

## DEPARTMENT OF FISHERIES

## DETAILS OF CANNED HERRING BELOW CERTIFICATE STANDARD

	Plain		Tomato		Total
	Grade B	Below Grade B	Grade B	Below Grade B	
1 lb. talls.....	964	504			1,468
1 lb. ovals.....	207				207
$\frac{1}{2}$ lb. ovals.....					
	1,171	504			1,675

Inspection fees collected, at the rate of one-half cent per case, amounted to \$6,129.05.

## HERRING FOR UNITED KINGDOM

The total pack of canned herring was purchased by the Department on account of the British Ministry of Food. The prices paid were similar to those obtaining in the previous year.

## PILCHARDS

The total catch of pilchards amounted to 59,116 green tons, which produced 10,278 tons of meal, 1,962,040 imperial gallons of oil, in addition to 94,164 cases of the canned fish.

## VIOLATIONS

During the year there were 109 prosecutions for infractions of the Fishery Regulations, resulting in the collection of \$11,928.09. Details follow:

	District No. 1	District No. 2	District No. 3	Totals
Prosecutions.....	47	38	24	109
Fines.....	\$ cts. 2,826 50	\$ cts. 1,685 00	\$ cts. 1,045 00	\$ cts. 5,556 50
Sales.....	1,852 93	4,064 93	453 73	6,371 59
Total—Fines and Sales.....	4,679 43	5,749 93	1,498 73	11,928 09

## EXPORT PERMITS

Assistance to the Department of Trade and Commerce during the year involved the issuing of export permits as follows:

	Vancouver Office	Inspector Scott, Victoria	Prince Rupert Office	Total
U.S.A.....	640	78	170	888
British Empire.....	86			86
Totals.....	726	78	170	974

## GASOLINE RATIONING

In line with the policy to assist other federal government departments where they have no adequate facilities, the fishery officers during the year issued the following number of gasoline and diesel oil cards to boats engaged in the fishing industry:

Issued By	Gasoline Cards Issued	Diesel Oil Cards Issued
Vancouver Office.....	603	451
New Westminster Office.....	137	8
Nanaimo Office.....	126	19
Nanaimo Inspectors in the Field.....	322	111
Prince Rupert Office.....	190	50
Prince Rupert Inspectors in the Field.....	87	42
Totals.....	1,465	681

## PATROL SERVICE

An even hundred boats were utilized during the year for the protection of the fisheries, 23 of them departmentally-owned.

Scarcity of competent personnel in the way of patrolmen, engineers, and deckhands, continued a source of great difficulty. In fact, it was necessary in several cases to employ boys of twelve and thirteen years of age, and women as engineers at full man's pay. The boys worked with their fathers as patrolmen, and the women with their husbands.

In outside areas, in particular, it is difficult to maintain adequate patrol, unless the air service and faster, more numerous surface patrol boats are available. The fishing boats which have been constructed in recent years have greater speed than most of the Department's boats and there is no doubt that the immediate future program of the Department should include a more efficient type of patrol boat, both from the standpoint of speed and seaworthiness, in addition to the restoration of the air service.

## DESTRUCTION OF HAIR SEALS

Bounty at the rate of \$2.50 per seal totalled \$2,080, paid on the destruction of 832 individuals. Notwithstanding the fact that by arrangement with the Wartime Prices and Trade Board extra ammunition was made available to fishermen for the purpose of shooting hair seals, the number so destroyed was still small. It would appear necessary to increase the amount of bounty if really satisfactory results are to be obtained.

As a result of the decreased intensity of hunting operations hair seals appeared to be more numerous than usual in several of the important gill-net areas. This was particularly the case in the Fraser River. With a view to assisting the fishermen, the aid of the several Armed Forces was requested, and although the situation was examined by representatives of the Forces the only method which promised any success was the utilization of 'planes with their machine guns, in the way of practice. After several attempts, however, it was found that the results obtained did not justify continuing these operations.

## TUNA FISHING

Although in the past tuna fishing off the British Columbia coast has been confined to fishermen from south of the international boundary, Canadian

fishermen during the past year showed considerable interest in this fishery. Few of their boats, however, are suitable, as the fishermen have to be prepared to go at least from 50 to 75 miles from shore. Notwithstanding that no regular tuna boats were available in British Columbia, a number of fishermen showed sufficient interest to land 4.636 hundredweights of this more or less luxury fish. The operators, however, claimed that in view of the high price which it is necessary to pay the fishermen to land their catches in British Columbia, canning operations were unprofitable. As a result, this product was placed in cold storage and later resold to United States canners. The price paid to the fishermen was in the vicinity of \$360 per ton, landed.

GRAYFISH (DOGFISH) OPERATIONS

Since the commencement of hostilities the demand for grayfish livers has increased tremendously, as shown by the following statement:

Year	Licences Issued	Landings	Average Price to Fishermen
		Lbs.	Cents
1940.....	406	1,566,500	6
1941.....	898	3,552,576	9
1942.....	1,235	4,241,286	16
1943.....	2,049	5,121,186	25
1944.....	3,052	7,769,574	34

FLATFISH FOR UNITED KINGDOM

During the year 1,791,500 pounds of frozen flatfish were shipped to the United Kingdom on account of the British Ministry of Food.

SPORT FISHING

The provincial public and many visitors continue to enjoy excellent sport fishing in the tidal waters of the province, particularly in the vicinity of those streams south of Seymour Narrows. The tyee and coho fishermen had an excellent season in the famous Campbell River area and conditions were also good in the Cowichan, Victoria, and Alberni districts on Vancouver Island and in the Howe Sound area near Vancouver. In the tidal portions of the Fraser River numerous residents of the province enjoyed outings, fishing from the shores and bars of the river for sport and domestic food purposes. In these operations Cutthroat, Dolly Varden, and Steelhead trout, as well as salmon and sturgeon are taken.

STAFF

James Boyd, District Supervisor of Fisheries at Prince Rupert, retired in September, after 32 years' faithful service with the Department.



STATEMENT No. 1—ANNUAL CANNED SALMON PRODUCTION IN BRITISH COLUMBIA—1933-1944

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned									
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	Totals
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases
1937	37	6,095	3,162	291	9	5	325,774	10,963	1,788	3,420	19,236	844	113,972	585,576	447,602	1,509,175
1938	38	7,125	3,453	300	9	5	447,453	10,276	2,322	2,933	27,417	1,035	273,706	400,876	541,812	1,707,830
1939	35	6,502	3,947	339	9	5	269,888	10,302	2,848	2,947	48,209	797	196,887	620,595	386,584	1,539,057
1940	38	6,392	3,222	350	9	5	366,403	11,868	2,856	3,017	23,277	1,205	201,467	213,911	643,443	1,467,227
*1941	36	5,502	3,080	333	9	5	455,297	17,794	3,911	28,771	30,027	3,454	361,380	427,766	920,470	2,248,870
1942	30	6,382	3,878	312	9	5	666,571½	11,197½	3,826	9,721	23,265½	4,649	187,873½	270,622½	633,834	1,811,560½
1943	30	6,043	4,346	290	9	5	164,889	4,171½	2,199	4,287½	14,059½	3,095	171,983	530,188½	363,347½	1,258,221½
1944	30	5,426	4,483	293	10	5	247,714	3,663½	2,368	13,330½	12,464	3,926½	169,082½	389,692	255,316½	1,097,557½

\* Does not include salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:—

.....	8	31	1,079	.....	39,104	6,339	46,561
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\* Does not include salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:—

.....	8	31	1,079	.....	39,104	.....	6,339	46,561
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NOTE.—Licences issued include transfers from one district to another, except in the case of purse-seines.

## STATEMENT No. 2—PACK OF CANNED SALMON ON THE NAAS RIVER—1935-1944

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned								Totals	
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink		Chum
*1935	3	310					12,712	94	298	168		143	21,810	25,508	17,481	78,214
†1935							12,245	86	298	168		143	5,125	21,443	12,681	52,189
*1936	3	349					28,562	1,622	229	316		496	11,842	72,022	20,196	135,285
†1936							24,137	520	188	237		496	8,439	60,582	16,504	111,103
*1937	2	321					17,590	773	245	232		46	12,336	7,876	10,530	49,628
†1937							11,630	773	245	232		46	316	5,688	6,009	24,939
*1938	2	309					21,746	458	189	125		188	20,485	61,660	15,135	119,986
†1938							14,795	13	165	125		188	3,986	29,843	6,804	55,919
*1939	2	289					24,425	170	389	149		15	3,209	29,819	2,615	60,791
†1939							18,834	17	297	137		15	1,667	19,479	1,784	42,230
*1940	2	254					13,810	1,258	181	275		120	11,447	29,893	5,461	62,445
†1940							8,056	118	95	99		117	1,975	12,151	2,149	24,750
*1941	2	281					24,876	133	187	207		377	14,430	23,274	5,971	69,455
†1941							14,221	16	125	147		177	6,711	12,570	1,757	35,694
*1942	2	328					24,461	496	366	255		619	21,008	54,038½	12,691	113,934½
†1942							11,415	46	202	159		155	9,804	24,693½	5,794	52,268½
*1943		199					13,413	422	386	194		334	9,769	17,670	10,156	52,344
†1943																
*1944	1	186					13,318	334	179	109½		318½	7,324	34,707	10,155	66,445
†1944							2,681	73½		32½		23	389	14,375	2,423	19,997

\* Pack of fish caught at Naas River regardless where canned.

† Pack of Naas River regardless where caught.

NOTE.—Licences issued, include transfers from other districts.

STATEMENT No. 3—PACK OF CANNED SALMON ON THE SKEENA RIVER—1935-1944

Year	Num- ber of can- neries oper- ated	Number of salmon licences issued				Packed canned										Totals	
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue- back	Steel- head	Coho	Pink	Chum	cases	
†1935.....	9	1,053					64,140	3,443	429	188		12	45,512	99,412	31,807	244,943	
†1935.....							52,879	3,422	429	188		14	23,498	81,868	8,122	170,420	
†1936.....	8	970					97,823	4,883	455	435		33	55,198	178,299	36,892	374,018	
†1936.....							81,960	3,781	414	356		33	32,142	92,997	15,343	227,026	
†1937.....	7	850					55,811	3,788	382	315		21	34,502	72,455	37,431	204,705	
†1937.....							41,023	3,704	382	315		21	14,573	57,623	10,027	127,668	
†1938.....	6	1,049					73,508	3,361	1,105	259		42	100,658	146,676	34,785	360,454	
†1938.....							46,958	2,916	1,141	259		42	38,542	69,299	14,668	173,855	
†1939.....	6	844					96,358	3,277	1,488	348		55	48,973	127,521	15,606	293,686	
†1939.....							68,388	3,124	1,396	336		55	27,115	91,559	6,360	198,333	
†1940.....	7	926					133,854	5,884	1,113	571		133	62,516	91,612	62,114	359,797	
†1940.....							116,505	4,708	1,017	396		130	19,196	46,687	4,684	193,323	
†1941.....	7	981					110,544	4,695	703	448		2,261	126,557	73,896	54,357	373,461	
†1941.....							81,183	3,929	641	368		1,890	45,891	51,389	12,138	197,429	
†1942.....	6	775					57,539	5,850	874	832		3,670	70,384	146,322	31,481	316,952	
†1942.....							29,976	5,305	699	617		3,117	36,395	47,819	10,611	194,532	
†1943.....	8	749					51,476	1,443	838	623		2,323	63,638	122,040	57,579	299,961	
†1943.....							28,259	964	440	379		1,953	40,280	53,203	6,407	131,886	
†1944.....	8	725					92,203	1,176	664	289		2,724	38,159	190,872	87,071	413,159	
†1944.....							68,755	897	468	193		2,395	18,809	45,833	7,172	143,622	

† Pack of fish caught at Skeena River regardless where canned.

‡ Pack at Skeena River regardless where caught.

NOTE.—Licences issued include transfers from other districts.

## DEPARTMENT OF FISHERIES

STATEMENT No. 4—PACK OF CANNED SALMON FROM FISH CAUGHT AT RIVERS INLET AND SMITHS INLET—1935-1944

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned							Chum	Totals	
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho			Pink
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases
1935	8	2,023					166,686	138	352	155		63	9,576	8,966	19,563	205,499
1936	8	2,210					129,531	94	306	146		49	7,128	6,045	7,128	144,216
1937	6	1,875					59,138	317	132	162		60	7,432	6,497	13,158	86,896
1938	6	2,261					42,803	315	131	148		54	7,683	17,254	10,921	79,309
1939	4	1,817					108,170	377	396	235		75	6,374	7,973	18,894	142,494
1940	4	1,896					91,399	335	452	233		76	6,351	18,873	21,931	138,631
1941	2	1,355					122,093	744	181	359		169	17,257	10,827	15,832	167,732
1942	1	1,505					86,490	716	136	351		29	14,284	12,447	17,102	131,635
1943	4	1,817					71,068	412	206	329		133	16,125	14,580	7,437	110,290
1944	4	1,896					36,937	285	82	306		82	6,302	19,256	4,993	68,103
1945	4	1,896					89,142	810	238	320	21	91	12,744	4,085	15,167	122,618
1946	4	1,896					48,535	494	101	294		40	7,452	4,315	2,369	63,600
1947	2	1,355					115,342	1,006	148	667		179	25,165	5,558	23,203	171,268
1948	2	1,355					50,238	624	78	593		104	16,067	6,193	6,236	80,133
1949	1	1,505					95,082½	745	104	144		60	10,280	1,481	21,364	129,240½
1950	1	1,505					24,623	577	82	129		19	6,189	1,446	10,295	43,960
1951	1	1,449					66,855½	223	591	208		135	12,270	16,093	17,376	113,751½
1952	1	1,449					13,301	72	437	64		25	6,596	23,347	15,892	59,734
1953	1	1,090					40,859½	107	623	140		88	14,843	6,280	5,205	68,145½
1954	1	1,090					8,969	16	568	94		64	9,525	11,863	2,580	53,679
1955																

NOTE.—Figures shown in roman are packs from fish caught at Rivers Inlet or Smiths Inlet. Figures shown in italics are actual packs irrespective of where fish taken and not including fish shipped out for canning in other districts. Licences issued include transfers from other districts.



STATEMENT No. 5—PACK OF CANNED SALMON IN THE FRASER RIVER DISTRICT—1935-1944

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned								Totals	
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink		Chum
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases
1935†							57,212	4,205	212	4,984	350		24,600	111,328	8,227	211,118
1936*	11	1,784	118				165,651	7,128	461	8,426	20,647	6	51,243	23,842	188,538	465,942
1936†							164,408	6,680	310	8,142			22,572	30,663	2	232,777
1937*	10	2,082	190	58			103,137	3,877	226	1,940	19,065	15	25,618	252,416	119,254	525,548
1937†							66,583	3,622	84	1,738	1,354		11,242	87,897	20,934	193,469
1938*		2,319	190	112			217,882	4,592	413	1,532	21,923	15	54,314	29,862	181,444	512,034
1938†							169,430	3,754	32	508		13	28,687	63	49,835	252,322
1939*	10	2,161	210				73,216	5,092	475	1,511	32,833	86	48,120	204,681	143,020	509,034
1939†							43,294	4,465	448	1,094	8,428	69	17,144	108,608	42,480	225,986
1940*	10	2,237	212				121,080	4,036	311	1,042	13,627	178	47,397	13,243	178,860	379,774
1940†							86,215	3,411	279	770		144	12,369	12	40,056	143,256
1941†	11	2,025	195				149,716	7,132	1,285	25,507		248	28,260	102,799	90,274	405,221
1941*							196,871	8,290	1,425	26,396	18,466	315	91,571	179,071	360,623	883,028
1942†	12	2,754	406				418,491	2,396	324	6,982		314	10,559	136	82,586	521,788
1942*							474,035½	2,856	688	7,552	22,991½	314	34,004	9,075	264,736	816,260
1943†	11	2,613	484				28,938	1,059½	237½	2,181½		246	8,391	30,394	53,054	125,401½
1943*							72,507	1,393½	646½	2,852½	14,059½	291	38,747	162,495½	127,450	420,442½
1944†	10	2,582	550				85,650½	607½	469	11,499	52	293	15,708½	130	13,875½	128,291
1944*							107,431	1,172	947	12,196	12,303	332	46,928	33,756	50,421	265,456

\* Represents actual pack, regardless where caught.

† Represents pack of Fraser fish, regardless where canned.

NOTE.—Licences issued include transfers from other districts. 1936† pack of sockeye on Fraser, 104,408 cases, does not include 16,611 cases sockeye caught on Fraser and exported and canned in Puget Sound canneries. 1940† pack of sockeye on Fraser 86,215 cases, does not include 4,531 cases sockeye caught on Fraser and exported and canned in Puget Sound canneries. 1941† The above figures do not include packs of salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:

	Red Spring	Pink Spring	White Spring	Coho	Chums	Totals
1941 pack of 1940 catch.....	8	31	1,079	39,104	6,339	46,561

## DEPARTMENT OF FISHERIES

STATEMENT No. 6.—PACK OF CANNED SALMON OF PUGET SOUND, U.S.A., FROM  
1935 to 1944

Year	Number of canneries operated	Spring	Sockeye	Coho	Chum	Pink	Steelhead	Total
		cases	cases	cases	cases	cases	cases	cases
1935.....	14	9,737	54,677	71,985	15,604	377,445	.....	529,448
1936.....	9	6,328	59,505	29,119½	80,831½	1,345	.....	177,201
1937.....	14	8,968	60,259	32,559	17,417	327,833	.....	447,036
1938.....	13	2,787½	134,651	9,820½	7,852½	193	.....	155,304½
1939.....	14	2,439	43,511	54,773	14,505	275,485	.....	390,713
1940.....	9	1,991	63,890	30,478½	21,618	2,732	.....	120,718½
1941.....	9	4,706	110,605	45,968	21,170	153,686	.....	336,135
1942.....	10	1,460	263,458	6,582	3,896	710	.....	276,106
1943.....	10	2,872	19,116	26,219	224	61,479	.....	109,910
1944.....	3	1,178	37,509	475	15	306	.....	39,483

STATEMENT No. 7.—STATEMENT OF HALIBUT LANDINGS—BRITISH COLUMBIA—  
1935-44

(Includes landings in United States bottoms)

	Cwt.
1935.....	171,143
1936.....	168,121
1937.....	187,425
1938.....	193,488
1939.....	227,188
1940.....	239,043
1941.....	229,658
1942.....	243,915
1943.....	250,034
1944.....	189,248

STATEMENT No. 8.—CANNED PILCHARD PACK—BRITISH COLUMBIA—1935-44

	Cases		Cases
1935.....	27,184	1940.....	59,166
1936.....	35,007	1941.....	58,038
1937.....	40,975	1942.....	46,451
1938.....	69,374	1943.....	101,356
1939.....	7,300	1944.....	94,164

STATEMENT No. 9.—PRODUCTION FISH OIL AND MEAL—BRITISH COLUMBIA—  
1935-1944

Year	From Pilchards		From Herring		From Whales			From Other Sources*	
	Meal and fertilizer	Oil	Meal	Oil	Whale- bone and meal	Fertilizer	Oil	Meal and fertilizer	Oil
	tons	gals.	tons	gals.	tons	tons	gals.	tons	gals.
1935....	8,681	1,649,392	5,262	306,767	211	354	426,772	2,147	247,437
1936....	8,715	1,217,097	10,985	782,499	332	687	763,740	3,418	335,969
1937....	8,483	1,707,276	14,427	1,283,658	268	527	662,355	2,720	294,546
1938....	8,891	2,195,850	9,624	929,158	273	490	543,378	2,491	228,157
1939....	906	178,305	16,462	1,366,607	.....	.....	.....	3,004	283,504
1940....	4,853	877,556	24,264	1,700,819	181	434	381,620	3,526	285,314
1941....	10,473-2	1,789,708	8,757-5	584,157	271	577	566,505	5,081-6	390,939
1942....	11,550	1,622,840	10,898	643,577	130	205	255,556	4,837	263,481
1943....	15,456-4	2,233,281	7,126-5	675,002	62	90	134,553	2,315-9	156,808
1944....	10,278	1,962,040	8,832	889,213	.....	.....	.....	1,675-25	131,507

\* Salmon and halibut offal, gray fish, and anchovies.

## STATEMENT No. 10—NUMBER OF WHALES LANDED—BRITISH COLUMBIA—1935-1944

Species	1935	1936	1937	1938	1940	1941	1942	1943	1944
Sperm.....	175	311	265	252	126	233	130	69	.....
Sulphur.....	6	3	1	4	2	1	1	.....	.....
Fin.....	20	48	44	50	90	67	25	15	.....
Hump.....	1	14	7	4	2	27	7	7	.....
Sei.....		2							.....
Totals.....	202	378	317	310	220	328	163	91	.....

No whaling plants operated in 1939.

## STATEMENT No. 11—STATEMENT OF LICENCES ISSUED FOR SALMON CANNERIES AND SALMON FISHING GEAR (NOT INCLUDING LICENCES TO CAPTAINS AND ASSISTANTS ON SALMON SEINE-BOATS OR ASSISTANTS ON SALMON GILL-NET BOATS) BRITISH COLUMBIA—1935-1944

Kind of Licence	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944
<i>District No. 1—</i>										
Salmon cannery.....	10	11	10	10	10	11	12	11	10	
Salmon trolling.....	124	118	190	190	210	212	195	400	484	530
Salmon gill-net.....	1,663	1,784	2,082	2,319	2,161	2,237	2,025	2,670	2,613	2,582
<i>District No. 2—</i>										
Salmon cannery.....	26	27	20	22	18	20	17	14	14	15
Salmon purse-seine.....	102	99	82	100	98	131	95	105	87	94
Salmon drag-seine.....	9	9	9	9	9	9	9	9	9	10
Salmon trolling.....	930	964	916	958	863	737	791	706	903	876
Salmon gill-net—										
Lowe Inlet.....	58	74	76	80	135	106	61	25	83	91
Naas River.....	310	349	321	309	289	254	281	170	199	186
Skeena River.....	1,053	970	856	1,049	844	926	981	765	749	725
Rivers Inlet.....	1,699	1,802	1,490	1,796	1,550	1,518	1,070	640	1,211	948
Smiths Inlet.....	324	408	385	465	267	378	285	107	238	142
Bella Coola.....	268	265	261	242	216	192	161	155	194	175
Butedale.....	41	57	18	80	102	148	78	3	88	72
Namu.....	129	146	137	159	148	134	93	109	89	81
Queen Charlotte Islands.....		24	4	53	9	14	8	42	8	34
Total, salmon gill-net, District No. 2.....	3,882	4,095	3,548	4,233	3,560	3,670	3,018	2,016	2,859	2,454
<i>District No. 3—</i>										
Salmon cannery.....	7	8	7	6	7	8	8	4	5	5
Salmon trap-net.....	8	7	5	5	5	5	5	5	5	5
Salmon purse-seine.....	191	188	209	200	241	219	238	207	203	199
Salmon drag-seine.....										
Salmon trolling.....	2,053	2,429	2,056	2,305	2,874	2,273	2,094	2,737	2,959	3,077
Salmon gill-net.....	673	741	466	573	781	485	459	567	571	390
<i>Whole Province—</i>										
Salmon cannery.....	43	46	37	38	35	38	36	30	30	30
Salmon trap-net.....	8	7	5	5	5	5	5	5	5	5
Salmon purse-seine.....	293	287	291	300	339	350	333	312	299	293
Salmon drag-seine.....	9	9	9	9	9	9	9	9	9	10
Salmon trolling.....	3,107	3,511	3,162	3,453	3,947	3,222	3,080	3,843	4,346	4,483
Salmon gill-net.....	6,218	6,620	6,096	7,125	6,502	6,392	5,502	5,253	6,043	5,426

NOTE.—Salmon cannery licences shown above were issued by the Provincial Fisheries Department.

## STATEMENT No. 12—PACK OF SOCKEYE SALMON FROM RUNS TO FRASER RIVER, 1935-1944

Year	Fraser River Pack	Canadian Traps in Juan de Fuca Straits	Puget Sound Pack	Total Cases*
1935.....	57,212	5,610	54,677	117,499
1936.....	164,408	3,837	59,505	227,750
1937.....	66,583	6,152	60,259	132,994
1938.....	169,430	3,784	139,173	312,387
1939.....	43,249	4,290	43,511	91,050
1940.....	86,215	2,247	63,890	152,352
1941.....	149,715½	9,563	110,605	269,883½
1942.....	418,491	8,488	263,458	690,437
1943.....	28,938	1,339	19,116	49,393
1944.....	85,656½	2,494	37,509	125,659½

\*Figures represent pack of Fraser River sockeye, regardless where canned.





# LICENSES ISSUED BY PROVINCIAL FISHERIES DEPARTMENT 1944 SEASON

Kind	Number
Salmon Cannery.....	31
Herring Cannery.....	23
Pilchard Cannery.....	7
Shellfish Cannery.....	3
Tuna Fish Cannery.....	1
Herring Reduction Plants.....	10
Pilchard Reduction Plants.....	7
Dogfish Reduction Plants.....	3
Fish Liver Reduction Plants.....	8
Fish Offal Reduction Plants.....	9
Tierced Salmon Plants.....	6
Pickled Herring Plants.....	5
Cold Storage Plants.....	11
Fish-buyers' Licenses.....	463
Non-tidal Fishing Licenses.....	109
Sturgeon Fishing Licenses.....	1

## STATEMENT No. 14—STATEMENT OF DIFFERENT SPECIES OF SALMON AND METHOD OF CAPTURE REPORTED BY OPERATORS OF SALMON PURSE-SEINES, DRAG-SEINES AND TRAP-NETS AND BY SALMON CANNING, CURING AND COLD STORAGE ESTABLISHMENTS, OF GILL-NET AND TROLL CAUGHT FISH—BRITISH COLUMBIA—SEASON 1944.

Method of Capture	Sockeye	Springs	Blue-backs	Steel-heads	Cohoe	Pink	Chums	Totals
Troll.....	5,926	146,169	148,371	387	499,369	141,643	36,208	978,078
Gill-net.....	1,791,726	114,691	195	37,838	456,344	1,553,478	374,417	4,328,689
Purse-seine.....	128,462	6,597	19	1,311	345,511	5,076,284	1,969,392	7,527,556
Drag-seine.....	50,526				11,564	12,029	9,688	83,807
Trap-net.....	27,457	8,902		1,097	29,721	605	697	68,479
Totals.....	2,004,017	276,356	148,585	40,625	1,337,536	6,636,325	2,289,427	12,732,871

## STATEMENT No. 15—STATEMENT OF NUMBER OF SALMON CAUGHT BY PURSE-SEINES, SHOWN BY SEINING AREAS BRITISH COLUMBIA—SEASON 1944

Area	Sockeye	Springs	Blue-backs	Steel-heads	Cohoos	Pinks	Chums	Totals
1.....	105	217			1,847	727,268	26,312	755,749
2.....	9	13		2	35,053	695,595	723,320	1,453,992
3.....	9,788	574		129	18,549	632,852	66,030	727,922
4.....	43				374	57,301	1,147	58,865
5.....	35,358	107		45	24,917	559,307	39,353	659,087
6.....	42,936	628		65	46,654	863,114	193,517	1,146,914
7.....	2,121	183		181	15,564	481,709	141,161	640,919
8.....	1,407	77		228	6,081	259,853	52,890	320,536
9.....	1,045	64		41	5,476	130,180	39,286	176,092
10.....		5			1,670	12,310	15,805	29,790
11.....					1,690		18,864	20,554
12.....	28,474	3,962	19	519	95,283	528,729	320,619	977,605
13.....	4,188	515		73	26,836	120,437	220,079	372,128
14.....		125		1	804	1,430	26,664	29,024
15.....				10	425		6,988	7,423
16.....	121	3			122		4,836	5,082
17.....	299				27		2,505	2,831
18.....	322	10		8	517	186	16,010	17,053
19.....								
20.....								
21.....	372	15		6	2,304	6,013	1,225	9,935
22.....					2,397		3,067	5,464
23.....		96		2	7,313		6,803	14,214
24.....	1,874				5,328		7,334	14,536
25.....		3			5,468		31,342	36,813
26.....					29,300		682	29,982
27.....				1	11,512		3,553	15,066
Totals....	128,462	6,597	19	1,311	345,511	5,076,284	1,969,392	7,527,556

## DEPARTMENT OF FISHERIES

STATEMENT No. 16—STATEMENT SHOWING PACKS OF CANNED SALMON, 1935-1944  
WITH QUANTITIES GRADED SECOND QUALITY AND PERCENTAGES

	Sockeye	Spring	Steel-head	Blue-back	Coho	Pink	Chum	Total
1935 Pack cases.....	350,444	21,920	596	15,319	216,173	514,966	409,604	1,529,022
Grade B, cases.....	3,435	659			3,840	20,528	5,601	34,063
Per cent.....	.980	3.006			1.776	3.986	1.367	2.227
1936 Pack, cases.....	415,024	29,854	1,068	33,718	212,343	591,532	597,487	1,881,026
Grade B, cases.....	13,725				483	29	5,265	19,502
Per cent.....	3.307				.227	.005	.881	1.036
1937 Pack, cases.....	325,774	16,171	844	19,236	113,972	585,576	447,602	1,509,175
Grade B, cases.....	65				68	27,282	3,212	30,627
Per cent.....	.019				.059	4.659	.717	2.029
1938 Pack, cases.....	447,453	15,531	1,035	27,417	273,906	400,876	541,812	1,707,830
Grade B, cases.....	16,361			56½	1,111	1,413	1,583	20,524½
Per cent.....	3.656			.206	.405	.352	.292	1.201
1939 Pack, cases.....	269,888	16,097	797	48,209	196,887	620,595	386,584	1,539,957
Grade B, cases.....	3,444½	11	20	17	142½	45,667	1,068	50,370
Per cent.....	1.276	.068	2.509	.035	.072	7.358	.276	3.272
1940 Pack, cases.....	366,403	17,741	1,205	23,277	201,467	213,911	643,443	1,467,227
Grade B, cases.....	1,778½	57		13	461	2,530	3,298½	8,138
Per cent.....	.485	.321		.054	.228	1.182	.512	.554
1941 Pack, cases.....	445,297	50,476	3,454	30,027	361,380	427,766	920,470	2,248,870
Grade B, cases.....	1,186½	152½	2	33	539½	64,866	25,161½	91,941
Per cent.....	0.260	0.301	0.057	0.109	0.149	15.163	2.733	4.088
1942 Pack, cases.....	666,046	24,703	4,649	23,265	187,873	270,663	634,784	1,811,983
Grade B, cases.....	41,045	256		87	430	5,841	19,375	67,034
Per cent.....	6.162	1.036		0.373	0.228	2.158	3.052	3.699
1943 Pack, cases.....	164,889	10,658	3,095	14,059½	171,983	530,188½	363,347½	1,258,221½
Grade B, cases.....	227½	69			3	25,412½	3,333	29,045
Per cent.....	0.137	0.647			0.002	4.793	0.917	2.308
1944 Pack, cases.....	247,714	19,362	3,926½	12,464	169,082½	389,692	255,316½	1,097,557½
Grade B, cases.....	723	101	1½		86	2,777	1,238½	4,927
Per cent.....	0.292	0.521	0.038		0.050	0.712	0.485	0.448

STATEMENT No. 17—RECAPITULATION OF FISH LIVER AND VISCERA  
PRODUCTION 1944

Species	Purchases		In Cold Storage		Oil Produced		Total Value Marketed or Prepared for Market
	Pounds	Value	Pounds	Value	Pounds	Value	
		\$		\$		\$	\$
Gray Cod Livers.....	12,185	907	1,326	119	3,794	786	905
Gray Cod Viscera.....			158	15			15
Halibut Livers.....	217,639	143,055	11,246	8,040	27,207	146,915	154,955
Halibut Viscera.....	347,376	59,173	20,520	2,501	22,781	86,197	88,698
Black Cod Livers.....	47,617	49,512	3,988	4,273	7,891	57,776	62,049
Black Cod Viscera.....	44,439	12,716	76	7	4,084	18,920	18,927
Ling Cod Livers.....	156,111	265,933	15,379	26,645	20,025	310,295	336,940
Ling Cod Viscera.....	105,262	10,644	11,479	1,147	8,734	8,283	9,430
Red Cod Livers.....	31,937	25,417	5,667	4,120	2,566	27,166	31,286
Red Cod Viscera.....	3,368	573	39	4	412	268	272
Grayfish Livers.....	7,769,564	2,661,573	180,143	60,930	4,732,008	3,661,131	3,722,061
Soupfin Shark Livers.....	61,510	218,335	4,063	12,205	34,690	288,436	300,641
Mudshark Livers.....	116,940	25,441	1,319	290	80,828	28,650	28,940
Sole Livers.....	402	119	614	193	3	10	203
Skate Livers.....	11,063	362	769	23	5,030	1,006	1,029
Ratfish Livers.....	110,989	5,037	1,403	39	68,939	7,526	7,565
Salmon Livers.....	6,880	645	2,126	210	64	566	776
Misc. Shark Livers.....	13,961	2,150	926	69	9,041	4,520	4,589
Mixed Cod Livers.....			82	82	30	16	98
Mixed Cod Viscera.....					612	1,446	1,446
		3,481,392		120,912		4,649,913	4,770,825

## SPAWNING REPORT, 1944

## GENERAL

*Sockeye*.—Good supplies were found in the Skeena River watershed, Bella Coola district, and the Chilco section of the Fraser River watershed. In the Naas and Lowe Inlet areas the seeding was satisfactory. At Rivers Inlet, whilst some of the most important streams were well supplied, the seeding generally was only fair. At Smiths Inlet it was not up to expectations. In view of the fact that disappointing percentages of four-year fish in 1943 and five-year fish in 1944 were found on the Rivers and Smiths Inlet spawning beds, there would appear reason to believe that some unknown conditions were present during the spawning of the brood year of 1939 which caused an unusual mortality in the eggs or fry.

*Springs*.—Taking the province as a whole the seeding was fair.

*Coho*s.—In the northern areas satisfactory supplies were observed. Conditions were better in the southern portion of the province, particularly in Vancouver Island streams.

*Pinks*.—In the Yakoun River and the streams tributary to Juskatla Inlet, all in the Massett district, Queen Charlotte Islands, the seeding was good. Similar conditions obtained in the Lowe Inlet and Bella Bella areas, and along the mainland streams of the Alert Bay area the seeding was the best observed in the past ten years. The seeding in the Skeena area was not up to expectations. In the Vancouver Island streams, south of the Alert Bay area, the supplies were not entirely satisfactory.

*Chums*.—Generally speaking, there was a very considerable shortage of this variety found on all the spawning grounds in the province, notwithstanding that the spawnings of previous years justified the expectation of a reasonably good return in 1944.

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In the inspection of the Rivers and Smiths Inlet spawning grounds this year the fishery officer was accompanied by representatives of the salmon cannery. An endeavour was made to have someone representing the fishermen also accompany the party but without success. It is to be hoped that in future inspections the industry will take sufficient interest in spawning conditions in the several areas to have representatives present, particularly during the inspections of the most important areas.

## IN DETAIL

*Queen Charlotte Islands Area—North*

Satisfactory supplies of coho salmon were found on the spawning grounds. A good seeding of pinks occurred in the Yakoun River and in the streams tributary to Juskatla Inlet, the two most important spawning grounds of this species. As a matter of fact, all the streams tributary to Massett Inlet, with the exception of the Ain River, contained good supplies of pinks, and the seeding at Yakoun, Mammon, and Detlamen rivers is reported as heavy. The seeding in the streams tributary to Naden Harbour, however, was poor. The chum seeding is reported as a failure.



*Queen Charlotte Islands Area—South*

The pink supplies on the spawning grounds of this area were better than average and quite satisfactory. This applies to all pink creeks, particularly those in the Cumshewa area. The pink seeding in the Skidegate area and in the streams along the east coast was an improvement over that of the cycle year. Supplies in the west coast streams, however, were disappointing. The chum seeding at Skidegate Inlet, Salmon Creek, and in the Jedway area was satisfactory. Elsewhere the seeding was poor.

*Lower Naas Area*

The escapement of sockeye through the lower reaches of the Naas district is reported as being quite good, particularly so in view of the less intensive fishing this year. The seeding by springs was apparently below average. The coho supply is reported as being above average in most of the creeks, with heavy escapement to the Khutzeymateen, Quinnimas, and Ikinik rivers. The pink seeding was the best since 1936, the numerous streams in Khutzeymateen Inlet receiving good supplies. The chum supply was better than average, with a marked improvement at Toon River and Alice Arm.

*Upper Naas Area*

A satisfactory seeding of sockeye was observed in the Meziaden Lake district, which is the chief spawning ground of this variety in the Naas watershed. The supply was somewhat lighter than the heavy seeding reported in 1939, but better than that of 1940 and last year. The spawning grounds of the lake were well covered with spawning salmon. Fish were still ascending the fishway, and, due to high water conditions, also the falls, at the time of inspection. Approximately 75 per cent of the run is reported to be on the large or five-year variety. Spawning conditions were normal. The supply of springs was found to be fair, but the cohoes were just commencing to arrive at the time of the inspection. According to the officer reporting for the lower reaches of the watershed, however, there was a good run of this variety proceeding up river. The fishway is reported to be in good condition, but the outside wall of the cribbing is rotted away and will require to be repaired in the near future. The Indians did not take any salmon from the Meziaden Lake area this season.

*Upper Skeena Area*

In the upper reaches of the Skeena River watershed the inspecting officer reports a seeding of sockeye comparable with that of the cycle year of 1940, which was reported at that time as good, the fish being of a good average size individually. The escapement to the Babine, Morice, and Nakina districts is especially mentioned. Some creeks, of course, were better than others. For instance, at Fifteen Mile Stream the seeding was not quite so good as in 1940. Twin Creek showed an increase of 100 per cent over 1940; Pierre Creek 15 per cent better than 1940; Fulton River showed a seeding comparable with that of 1940, although not quite as good as that of 1939 when the seeding in the Babine Lake area was reported as being the largest during the preceding decade. The supplies in both Upper and Lower Babine rivers were comparable with the years 1939 and 1940. A good seeding of springs occurred in Bear and Morice rivers, but only fair quantities were found in Babine River. A very satisfactory seeding of cohoes occurred in the Morice and Nakina rivers. The supply of pinks was disappointing. The chum seeding was very light.



*Lower Skeena Area*

Good supplies of sockeye were observed in William Creek, tributary to Lakelse Lake. This is the principal sockeye spawning stream. The seeding in the smaller tributaries was light. The seeding in the Oestahl River is reported as being good. A heavy supply was observed at Shawatlans. The spring supplies in the Oestahl system are reported as being heavy, and the cohoes satisfactory. The pink seeding at Lakelse was heavy and good in the Oestahl system. The chum seeding was only fair.

*Lowe Inlet Area*

Nearly all streams received good supplies of spawning sockeye. Water conditions in the streams were very favourable to the ascent of the fish. The coho supply was normal. The pink seeding in the northern portion of the area was heavy and nearly all streams were well seeded, particularly the streams in Kitkatla Inlet and the upper portion of Grenville Channel. The supplies in the southern portion of the area, while not being as heavy as those in the north, were quite satisfactory. The chum seeding is reported as being light, with the exception of Union Pass where the seeding was heavy.

*Butedale Area*

The sockeye seeding in the streams tributary to Gardner Canal and Talamosa Inlet was good. Conditions in the balance of the area were fair. The Coho supplies showed an improvement over those of the brood year, particularly in the Gardner Canal and Devastation Channel portions of the area. Pinks were found in satisfactory quantities, particularly in the Gardner Canal and Devastation Channel sections. On the whole the pink seeding was quite satisfactory. The chum seeding, apart from that at Price Creek, was poor.

*Bella Bella Area*

The sockeye escapement was fully equal to expectations and a distinct increase as compared with the brood year. There was a satisfactory seeding by cohoes. Pinks compared well with the brood year, with increases in some streams. The seeding at Koeve River was particularly heavy. The chum seeding was considerably in excess of that of the brood year in all the larger streams, particularly those in the Ellerslie area. During the season there was an ample supply of water in all streams for the ascent of salmon. The spawning conditions generally were satisfactory.

*Bella Coola Area*

The sockeye seeding was fairly heavy, especially at Kimsquit Lake. There were also very good supplies in the Bella Coola-Atnarko River system. Numerous runs were again observed. The seeding by spring salmon was very good, especially in the Atnarko River. The early coho supplies are reported as light, but there was a considerable improvement during October and November, and the supply of this variety is reported as quite adequate. A medium supply of pinks was present on the spawning grounds, and an excellent spawning of chums in all streams is reported, especially so in the streams tributary to Dean Channel.

*Rivers Inlet Area*

The usual two inspections were made of this area, the first between September 4 and 8 and the second between October 16 and 25. The escapement of sockeye to the Owekano Lake system is reported as light. The spawning in some rivers was up to normal but others are reported as being below. The importance of the several sockeye spawning streams, tributary to Owekano Lake, is in the following order: Whannock River, Quap River, Shumahault River, Genesee River, Waukwash River, Askum River, Indian River, Dallec River, Cheo River, Nookins River, and Hatchery Creek.

The streams in which conditions were found normal are the Whannock, Quap, Genesee, and Dallec, three of these, fortunately, being of the most important. Conditions found in the Waukwash and Indian rivers at the head of the lake were most unsatisfactory. Viewed in comparison with the commercial catch the seeding could be classed as good, but the commercial catch was smaller than expected, in which condition weather was a factor. This year it is the large or five-year old sized sockeye which have failed to return in large numbers. It will be remembered that in 1943 it was the four-year fish which were scarce, the conclusion being that some unusual, unknown condition affected the spawning of 1939. The coho supplies in the area were only fairly satisfactory. Pinks were light, and chums scarce. In the streams below Owekano Lake the coho supplies were fair, while the pink seeding is reported as good, although the runs of this variety are never large. The chum seeding at the Kildala and Chuckwalla rivers was reported as really good. This also applies to Whannock River. Due to heavy rains and the resultant flood conditions some damage may have been done in the Rivers Inlet area, although these conditions occurred previous to the major escapement of sockeye. Two representatives of the cannery interests accompanied the fishery officer on his inspections of the Rivers Inlet area.

*Smiths Inlet Area*

There are only two sockeye salmon streams of any importance in this area—the Geluck and Delabah rivers, the first being much the more important. Two inspections were made, the first between September 10th and 12th, and the second between October 10th and 12th. It was expected that the sockeye returns would be very poor in 1944 and consequently the commercial fishing boundary was moved but so as to provide a larger percentage of the runs to pass to the spawning grounds. As a result, the escapement is reported by the local, well experienced, fishery officer as a decided improvement over the five-year cycle year of 1939, for instance, although not entirely satisfactory. Flood conditions in this area may also have done some damage between the early and late runs. A heavy seeding by spring salmon is reported, cohoes fair, pinks to the Nekite River good, and chums only fair in the Nekite, poor in the Southeast Arm, and good in the Takush River. Two representatives of the cannery interests accompanied the fishery officer on the inspections of Smiths Inlet area.

*Fraser River Watershed*

*Prince George Area.*—The sockeye supply on the spawning beds of the Nechaco River system, while not showing the exceptionally large increase of the immediately preceding cycle year, was an improvement on that of the brood year. The increase to the Francois Lake watershed was approximately 40 per cent. The supply in the Stuart Lake watershed showed a considerable percentage of increase, although the total numbers in recent years have been small. Spawning conditions generally were quite favourable. The supplies of spring salmon were definitely disappointing.

*Quesnel Area.*—The run of sockeye to the Chilco Lake district was late in arriving but when it did come, between late August and early September, it was very heavy, producing some 350,000 spawning fish, which was equal to the seeding of the brood year of 1940. Conditions in this area continue to be very encouraging. A few scarred sockeye were observed and a higher percentage of unspent females than in the past several years. In the Quesnel Lake system, including the Horsefly and Mitchell rivers, the sockeye seeding was practically nil, at Bowron River only about 35 per cent of that of the brood year. A higher percentage of unspawned females than usual was noticed in this district also. Bears destroyed approximately 10 per cent of the salmon, both green and partly spent. The seeding by springs throughout the whole inspectorate was only fair.

*Kamloops Area.*—The sockeye seeding was disappointing, although no large run was expected. This applies to all the main sockeye spawning areas such as Little River, Adams River, and Raft River systems. The supplies of springs were also disappointing. Indications of the coho seeding were more encouraging than those of the brood year, although the supply was not large. High water prevailed throughout the spawning season and as a consequence estimates were difficult.

*Pemberton Area.*—From 300 to 400 sockeye were observed in the Anderson Lake system. A good seeding occurred in the Birkenhead River. Satisfactory supplies were also found in the main Lillooet River. Fair supplies of springs were observed in the Squamish River, Seton Lake, Bridge River, and Birkenhead River systems. The coho seeding was fair in the Squamish River and Birkenhead River systems. Few pink salmon were observed in the Squamish area. A fair seeding of chums occurred in the Squamish River.

*Chilliwack Area.*—The return of sockeye to Cultus Lake totalled slightly over 14,000 salmon, compared with 74,000 in the brood year. The usual small numbers were observed in the Chilliwack River. The seeding by springs was light, cohoes not up to expectations, and chums decidedly disappointing.

*Harrison Area.*—Only a fair seeding of sockeye was seen at Silver Creek, tributary to Harrison Lake, but a very satisfactory return to Morris Creek, the main sockeye tributary. Only a fair seeding of springs and cohoes was observed. The chum supplies were definitely disappointing.

*Pitt Lake Area.*—Sockeye salmon were present in quantities equalling those of the brood year. Only light supplies of springs, cohoes, and chums were observed.

*Lower Fraser Area.*—Quite a satisfactory seeding of coho occurred in the Nicomekl and Serpentine rivers. This was the "off" year for pinks in the Fraser system.

*North Vancouver Area.*—The supplies of cohoes and chums were far below expectations.

#### *Alert Bay Area*

The sockeye seeding at the Nimpkish River was disappointing, particularly in view of the satisfactory supplies in 1940, the brood year. The seeding at Fulmore River, Keough River, and McKenzie and Quatsi rivers was only fair, with light runs to Kahweiken, Kleena-Kleene, Nahwitti, and Shushartie rivers. The spring supplies were found to be normal. The coho seeding in nearly all streams was satisfactory. The supply of pinks to the mainland streams is reported as the heaviest for the past ten years and nearly all streams were well seeded. Most streams showed an improvement over the brood year of



1942. In the streams along the Vancouver Island portion of the district the seeding was fair. The inspecting officer describes the seeding of the whole district generally as being fifty per cent greater than that of the brood year. Heavy supplies of chums were observed at Seymour, Salmon, and Bond rivers. Other streams throughout the district contained only medium or light supplies. The Nimpkish River seeding was disappointing in view of the heavy spawning of 1940.

#### *Quathiaski Area*

At Hayden Bay and Phillips Arm, the principal sockeye spawning grounds in this area, the seeding is reported as only twenty-five per cent of that of the brood year at the former point but quite satisfactory at the latter. The spring seeding at Campbell, Salmon, and Phillips rivers was good. The coho escapement was quite satisfactory, particularly to the streams tributary to Bute Inlet. The pink seeding is reported as a failure all through the area, apart from Bear River and the streams tributary to Bute Inlet, where good supplies were observed. Chums were very scarce; the spawning by this variety was estimated to be only fifteen per cent of that of the cycle year.

#### *Comox Area*

Natural spawning conditions throughout the fall from the standpoint of low water levels were poor over this whole district. The supply of springs to the Puntledge River was fairly satisfactory. The coho seeding in the streams between Shelter Point and Cape Lazo was very satisfactory, particularly at Oyster River. This was no doubt partly the result of the enforcement of longer closed periods. The supplies in the Courtenay River system were satisfactory. The seeding in the streams tributary to Bayne Sound and south to Englishman's River, including the Big and Little Qualicum, was decidedly poor. The pink seeding was light. A good percentage of the chum run passed safely to the spawning grounds, due to the less intensive fishing and the timely arrival of the fall rains. It is possible, however, that there may be some loss in spawn, due to the seeding taking place on gravel bars above normal water levels. In the spawning streams between Shelter Point and Nile Creek the seeding compared favourably with the light one of four years previously. The quantities found at Big Qualicum River represented approximately 25 per cent of the heavy seeding of 1940 and at Little Qualicum only 33½ per cent.

#### *Pender Harbour Area*

Only a light seeding of sockeye was observed in Saginaw Lake, notwithstanding the fact that commercial fishing was not intensive. At Tazoonie River some 5,000 sockeye were observed on the spawning grounds, compared with 400 in the brood year. An increased seeding by springs was noted. There was an adequate escapement of cohoes. The pink seeding in the Jervis and Toba Inlet systems is considered adequate, although considerably less than that of the brood year. The chum supply, while considered reasonably satisfactory, was not up to expectations.

#### *Nanaimo Area*

The coho supplies in the streams between Nanaimo and Arbutus Point, including Nanoose Bay, were quite satisfactory. The chum seeding is reported as being only 60 per cent of that of the brood year.



*Ladysmith Area*

No sockeye were observed in the Nanaimo River. There was an average seeding of springs and a satisfactory supply of cohoes. The spawning by chums was very disappointing, being reported as only about 50 per cent of that of the brood year.

*Cowichan Area*

Springs were found in good average quantities on the spawning grounds. Cohoes were about 70 per cent of the brood year, and chums 75 per cent of 1940. The steelhead supplies are being well maintained.

*Victoria Area*

A satisfactory seeding of coho was found in this area. The chum supplies in the Sooke River were unsatisfactory but a good seeding occurred in the Goldstream Creek.

*Alberni Area*

There was a fair seeding of sockeye in the Somass River, Great Central and Sproat Lake systems. Although fewer salmon were observed using the fishway at Stamp Falls this was on account of natural conditions being more favourable; an unusual percentage of the run passed over the falls without the aid of the fishway. A satisfactory seeding was observed in the Anderson Lake system. The escapement to Hobarton Lake is reported as being very satisfactory, partly as a result, no doubt, of the enforcement of an increased closed period. The supplies of spring salmon to the Somass River, Stamp River, and Nahmint River systems are reported as being very good but the escapement to the Toquart, Sarita, and Nitinat rivers was only fair. The coho seeding was exceptionally good in all streams frequented by this variety. The chum supplies, on the other hand, were extremely disappointing and are reported as a failure. No salmon of any species was observed at the Maggie River fish ladder.

*Clayoquot Area*

A larger proportion than usual of the run of sockeye escaped to the spawning grounds of Kennedy Lake and provided a fairly satisfactory seeding, comparable with that of the brood year. The seeding in the Medgin River watershed compared favourably with that of the brood year. The supplies of spring salmon were excellent and compared favourably with the spawning of 1943, which had been the heaviest in four years. Coho supplies were also found to be excellent. The chum seeding was the poorest of the last four years.

*Nootka Area*

A fair seeding of springs occurred at Gold and Burman rivers. The coho seeding was average. The chum supplies, however, are reported as being the poorest known except in the Tahsis River and Sow End River.

*Kyuquot Area*

The spawning of springs was below average but the coho seeding was fairly satisfactory. The chum supply was reported as being very poor, and even less than the very light brood year.

*Quatsino Area*

There was the usual small supply of sockeye on the spawning grounds but in this area these runs are of little value commercially. The seeding of springs was normal in Marble Creek which is the principal stream used by this species. The coho supply is reported as being above the average in the district, particularly at East Creek, Buck Creek, Marble Creek, Rupert River, Spruce River, and Mahatta River. The seeding of pinks, generally speaking, was light, although heavy at East Creek and Rupert River. The chum seeding was very disappointing.

## APPENDIX NO. 2

**REPORT OF THE CHIEF SUPERVISOR OF FISHERIES, EASTERN  
DIVISION (COLONEL A. L. BARRY) FOR THE YEAR 1944**

Figures contained in this report as to catches and values are approximate only. They are intended to give as complete an account of fisheries results in the division during the year as is possible at the time of writing when final revised figures are not in all cases available. While no great changes are anticipated, the figures must be read as subject to revision.\*

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Fish and shellfish landed in the division during 1944 amounted in quantity to approximately 547 million pounds, showing an increase of about 33 million pounds when compared with 1943. Values for the year reflected corresponding increases—a gain of, roughly, \$2,000,000 in the value to the fishermen and over \$3,000,000 in the marketed value.

## THE COD FISHERY

Cod landings increased by approximately twenty-eight and one-half million pounds. A large increase occurred in Nova Scotia landings, while those of New Brunswick and Prince Edward Island decreased. The total landed value for the division increased by \$1,000,000 and the marketed value by about \$2,000,000.

## THE LOBSTER FISHERY

The catch of lobsters increased by over two and one-half million pounds, resulting in an increase of over \$1,000,000 in the landed and marketed values. Increase in catch was general and occurred in all three of the Maritime provinces. The total catch for the division amounted to approximately 31 million pounds.

## THE SARDINE FISHERY

The sardine fishery, which is confined to the Bay of Fundy section, shows an increase of approximately three million pounds in catch and an increase of over \$70,000 in value to the fishermen.

## THE HADDOCK FISHERY

A decrease of over 4,000,000 pounds occurred in catch of haddock. The Nova Scotia catch accounts for practically the whole of the decrease although a further slight decrease occurred in Prince Edward Island and an increase occurred in the New Brunswick catch. The total decrease in landed value amounted to roughly \$130,000 while the total marketed value decreased by approximately \$400,000.

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\*Revised statistics for the year will be given in *Fisheries Statistics of Canada*, 1944.

## OTHER FISHERIES

The other principal varieties taken during the year were pollock, halibut, herring, clams, oysters and scallops, which showed increases over the previous year, and hake, swordfish and mackerel, which showed decreases.

*Nova Scotia*

The catch in Nova Scotia reached a record total of over 340 million pounds. The largest single increase was in the catch of cod, where the gain amounted to about 30 million pounds. Other line fish, with the exception of haddock, also showed increases, as did lobsters and herring. The total catch for the Cape Breton Island section of the province increased by approximately one-half million pounds while an increase of over eight million pounds was noted in the eastern mainland section and an increase of over 31 million pounds in the western section.

The total landed value of all fish and shellfish taken by provincial fishermen during the year was nearly \$15,000,000, while the total marketed value rose to approximately \$24,000,000. This meant an increase of roughly \$2,000,000 in both landed and marketed values when compared with the previous year.

The following table gives a statement of the total catch, the landed and the marketed values for the province, as well as similar information concerning the principal varieties:

1944

Total quantity of all fish landed.....	344,700,800 pounds
Total landed value.....	\$ 14,841,656
Total marketed value.....	\$ 24,008,759

	Pounds	Landed Value	Marketed Value
		\$	\$
Cod.....	169,842,400	5,932,393	10,660,763
Lobsters.....	17,141,000	4,137,073	4,274,786
Haddock.....	25,407,300	1,106,768	2,037,117
Herring.....	53,728,000	740,414	1,724,712
Mackerel.....	20,921,200	727,472	1,183,845
Swordfish.....	2,038,600	625,694	673,498
Pollock.....	18,252,700	364,083	694,467
Scallops (gallons).....	56,867	265,331	311,001
Hake.....	12,163,800	244,755	401,500
Halibut.....	1,298,700	212,330	334,661
Salmon.....	383,700	91,603	287,068
Smelts.....	881,300	86,015	106,735

*New Brunswick*

Total landings in New Brunswick, including those from inland waters, decreased by about five million pounds when compared with 1943. However, the landed value increased by over \$190,000 and the value of the fish marketed increased by over \$1,000,000. The two most important fisheries in the province, lobsters and sardines, increased considerably in both volume and value. Increases will also be noted in the catches of smelts and oysters.

The commercial catch of the inland district, which is included in the total New Brunswick figures, amounted to nearly 840,000 pounds, with a landed value of approximately \$38,000 and a marketed value of about \$42,000.

The following table shows the total catch, landed and marketed values of all fish and shellfish taken in New Brunswick, as well as similar information concerning the principal varieties:

1944

Total quantity of all fish landed.....	176,309,600 pounds
Total landed value.....	\$ 5,385,085
Total marketed value.....	\$ 12,655,973

	Pounds	Landed Value	Marketed Value
		\$	\$
Lobsters.....	7,200,000	1,611,620	3,474,442
Sardines.....	80,604,800	1,329,992	3,359,247
Cod.....	15,337,600	549,497	1,015,259
Herring.....	38,773,400	326,563	1,839,169
Smelts.....	4,348,700	526,991	692,528
Salmon.....	979,400	250,016	406,517
Clams.....	6,429,500	143,549	283,941
Oysters.....	4,671,200	162,185	274,393
Hake.....	3,396,300	99,311	207,757

### Prince Edward Island

Fishing activities in Prince Edward Island during the year did not prove to be as satisfactory as in the preceding year, a scarcity of cod and hake and unfavourable weather conditions accounting for a decrease of over five million pounds in the total quantity of fish and shellfish landed. The value of the catch at the point of landing decreased by approximately \$70,000 while the marketed value decreased by over \$260,000. Increases in catches and values will be noted in the case of lobsters, mackerel, smelts and oysters.

The table below gives the total catch, landed and marketed values of all fish taken in Prince Edward Island, as well as similar information concerning the principal varieties:

1944

Total quantity of all fish landed.....	27,461,700 pounds
Total landed value.....	\$ 1,797,308
Total marketed value.....	\$ 2,593,956

	Pounds	Landed Value	Marketed Value
		\$	\$
Lobsters.....	6,577,700	1,149,683	1,330,505
Cod.....	4,311,300	155,810	274,925
Hake.....	4,717,600	137,170	352,565
Mackerel.....	2,632,300	117,897	246,167
Smelts.....	1,073,700	85,896	130,035
Herring.....	5,529,900	69,611	140,979
Oysters.....	1,498,000	63,894	74,524

### SPORT FISHING

#### Nova Scotia

In Cape Breton salmon angling was a little better than in 1943. On the Margaree River there were more anglers than in the previous year and all were well satisfied with the catches taken. Trout fishing in Cape Breton



was considerably better than last year. In the eastern mainland angling, particularly for salmon, was not as successful as in 1943. This was due to the lack of rainfall from July onward to the early part of September. In the western mainland, much the same conditions prevailed and here again catches were below those of the previous year.

### *New Brunswick*

In New Brunswick salmon angling was not quite as good as last year, although several of the rivers produced larger catches. Water conditions were not as favourable as during the previous season and lack of rainfall was very noticeable. Conditions improved at the end of the season and it is felt that a betterment in fishing will be noticed next year.

### *Prince Edward Island*

Generally speaking, angling in Prince Edward Island was much better in 1944 than it had been for several seasons. Good catches of trout were taken in Western Prince county, Southern Queens county and in Kings county. Catches in Eastern Prince and Northern Queens were only fair.

## STATEMENT OF LOBSTER PACK AND THE INSPECTION OF CANNERIES DURING 1944

### *Packing Licences*

During the year 1944 licences to can lobsters and tomalley were issued covering 149 canneries. Of this number 137 of the plants were actually operated, as compared with 127 in 1943, 122 in 1942 and 123 in 1941. Comparative figures by provinces show the following distribution:—

	1944	1943	1942	1941
Nova Scotia.....	39	36	36	36
New Brunswick.....	49	44	41	42
Prince Edward Island.....	49	47	45	45
	137	127	122	123

### *Lobster Pack*

Preliminary figures show a total production of canned lobster within the division of 59,050 cases as compared with 56,882 cases in 1943, an increase of 2,168 cases. Comparing the 1944 figures with those for previous years, the following results are noted:—

Year	Pack Cases	Inc. or Dec. Cases	Percentage Inc. or Dec.
1944.....	59,050		
1943.....	56,882	+2,168	+3.8
1942.....	58,920	-130	-0.2
1941.....	53,926	+5,124	+9.5

Statistics of pack by provinces show the following:—

Province	1944	1943	Cases Inc. or Dec.
Nova Scotia.....	20,606	20,863	- 257
New Brunswick.....	17,444	17,427	+ 17
Prince Edward Island.....	21,000	18,592	+2,408
	59,050	56,882	

Nova Scotia's pack shows a decrease of 1.23 per cent as compared with 1943 and the following decreases as compared with 1940-42:—

Year	Pack Cases	Inc. or Dec. Cases	Percentage Inc. or Dec.
1942.....	21,696	-1,096	-5.05
1941.....	22,406	-1,800	-8.03
1940.....	21,678	-1,072	-4.94

The New Brunswick pack, when compared with 1943, shows an increase of .09 per cent and when compared with outputs for previous years shows the following increases:—

Year	Pack Cases	Inc. or Dec. Cases	Percentage Inc. or Dec.
1942.....	17,436	+ 8	+ 0.045
1941.....	13,430	+4,014	+30.55
1940.....	15,021	+2,423	+16.1

The pack in Prince Edward Island shows an increase of 12.95 per cent and shows the following increases when compared with previous years:—

Year	Pack Cases	Inc. or Dec. Cases	Percentage Inc. or Dec.
1942.....	19,788	+1,212	+ 6.1
1941.....	18,090	+2,910	+16.1
1940.....	17,285	+3,715	+21.5

During the Spring season of 1944 there were 46,259 $\frac{1}{2}$  cases canned, as compared with 44,166 $\frac{3}{4}$  cases in 1943 season—an increase of 2,092 $\frac{1}{2}$  cases or 4.7 per cent. Provincial figures covering the Spring pack show the following:—

Province	*Cases 1944	Packed 1943	Inc. or Dec. Cases	Percentage Inc. or Dec.
Nova Scotia.....	20,587 $\frac{3}{4}$	20,834 $\frac{1}{2}$	- 246 $\frac{1}{2}$	- 1.1
New Brunswick.....	8,401 $\frac{1}{2}$	8,014 $\frac{1}{4}$	+ 387 $\frac{1}{4}$	+ 4.8
Prince Edward Island.....	17,270	15,318	+1,952	+12.7

During the 1944 Fall season the pack was 12,776 cases as compared with 12,691½ cases in the Fall season of 1943, an increase of 84½ cases or .6 per cent. Provincial figures covering the Fall pack show the following:—

Province	*Cases 1944	Packed 1943	Cases Inc. or Dec.	Percentage Inc. or Dec.
Nova Scotia.....	2	3	— 1	—33.3
New Brunswick.....	9,044	9,420½	—376½	— 3.9
Prince Edward Island.....	3,730	3,268	+462	+14.1

\* All figures are based on preliminary reports and some slight discrepancies will be noticed with aggregate pack for 1944 as shown in an earlier table and the total of Spring and Fall pack combined.

#### CANNERY INSPECTION

During 1944 careful attention was given to the inspection of canneries and 796 inspections were conducted by 28 inspecting officers, the average number of inspections being 5.8 per cannery.

#### FISH INSPECTION

The inspectional staff had one of the busiest seasons since the introduction of the Fish Inspection Act. Despite the greatly increased duties required of them, the officers carried on in a most satisfactory manner and, although the catch was practically doubled in some districts, very little trouble was experienced in providing the necessary inspection service. The quality of the pickled and salted fish was generally satisfactory and very few re-inspections were requested by dealers and exporters. The grading of oysters and smelts was carried out as usual and the officers engaged in this work report conditions steadily improving. Approximately 14,000,000 pounds of fresh frozen fish were inspected before shipment overseas. This inspection was carried out largely by a staff of seasonal inspectors, specially trained for the work.

In addition to their inspectional duties, officers were required to secure samples throughout the canning season of different packs and forward them to the Fish Inspection Laboratory for examination. Faulty technique in canning was called to the attention of packers and they were given many useful suggestions for improving the quality of their goods. The voluntary grading of canned fish was carried out during the year and large quantities of lobsters, chicken haddie and mackerel fillets were submitted for grading. In addition, a large quantity of canned fish, for which no grading standards had been established, was submitted for inspection before shipment overseas.

#### ILLEGAL FISHING

During the year, illegal fishing was at a minimum although several minor outbreaks of illegal lobster fishing occurred. Close co-operation between inspectors, patrol boat men and guardians was maintained and this discouraged any concentrated effort on the part of the poachers to engage in illegal fishing to any great extent.

#### FISHERIES PATROL SERVICE

Generally speaking, the patrol services throughout the division gave effective protection to the fisheries. The boats were primarily engaged in the protection of the lobster fishery, with attention also being given to the salmon, oyster, smelt and other fisheries as required.

*Nova Scotia*

In the Cape Breton Island section the usual patrol was carried out in lobster fishing district 6A with satisfactory results. Along the eastern mainland patrol was carried out by the department-owned boat *A. Halkett*, assisted by the patrol boat *No. 666*.

In the western section patrol was carried out by the department-owned boats *Capelin* and *Gilbert*, assisted by a chartered boat in the Yarmouth area.

*New Brunswick*

In the Bay of Fundy section, the department's boats *Thresher* and *Gannet Rock* were again employed in patrol work. In the Northumberland Strait section, a fleet of four chartered boats was engaged. They were on duty from the last week of April until the end of November.

*Prince Edward Island*

In Prince Edward Island six boats were engaged. One of these was the department-owned *Capitol* and the others were chartered for duties in the several sections of the island.

## EDUCATIONAL WORK

Instruction in fish curing was necessarily curtailed during the year since, owing to the heavy amount of inspection work to be done, the inspectors formerly employed on educational instruction only were used on inspection of salt fish.

Instruction was intensified at canning plants, the instruction being given by Dr. Hess, of the Atlantic Fish Inspection Laboratory, and his assistant, Mr. R. E. S. Homans.

The usual instruction in organization and other forms of adult education to enable co-operative groups to carry on their activities was carried on throughout the year by the educational staff of St. Francis Xavier University, under arrangements made by the department and at departmental expense, and there are now in the division quite a number of good leaders in the various centres. The education is reflected in the annual statements of co-operative groups, which are drawn up in a comprehensive manner comparable to those of any well organized business, and most groups are availing themselves of the audit service of the Maritime Co-operative Services. Proper accounting is a necessary essential of satisfactory operation.

## CONCLUSION

Probably never before has the personnel of the division been called upon to undertake so many duties and in this I would refer particularly to the supervisors and inspectors grade 2 whose work has increased tremendously on account of inspection of fish for the war effort. No increase in staff was possible since trained men were not available. With all this volume of work some mistakes were made, it is true, but it is believed that in no case was there wilful neglect and the chief supervisor is pleased to note the confidence in our inspection service which is being built up throughout the industry.



### APPENDIX NO. 3

## ANNUAL REPORT ON FISH CULTURE

*By J. A. RODD, Director of Fish Culture*

Fish cultural operations in 1944 were carried on by the Department of Fisheries in Nova Scotia, New Brunswick and Prince Edward Island where the fisheries are entirely, or to a large extent, under federal administration. Thirteen main hatcheries, five rearing stations, six salmon retaining ponds and several egg collecting camps were operated with a total output from these establishments of 18,501,600, over 75 per cent of which were distributed in the fingerling and older stages. The output by species, hatcheries and provinces was:—

#### STATEMENT BY SPECIES OF THE FISH DISTRIBUTED DURING THE YEAR ENDED DECEMBER 31, 1944

Species	Fry	Advanced fry	Fingerlings	Yearlings and older	Total distribution
<i>Salmo salar</i> -Atlantic salmon.....	340,000	3,834,890	9,688,900	84,151	13,947,941
<i>Salmo fario</i> -Brown trout.....			6,460		6,460
<i>Salmo rivularis</i> Kamloops-Kamloops trout.....			15,500		15,500
<i>Salmo irideus</i> -Rainbow trout.....			394,786	3	394,789
<i>Salmo salar</i> sebago-Sebago salmon.....			3,700	19,093	22,793
<i>Salvelinus fontinalis</i> -Speckled trout.....	50,000	307,160	3,659,035	97,996	4,114,191
	390,000	4,142,050	13,768,381	201,243	18,501,674

HATCHERIES AND REARING STATIONS OPERATED, THEIR LOCATION, DATE ESTABLISHED, THE SPECIES AND THE NUMBER OF EACH SPECIES DISTRIBUTED FROM EACH ESTABLISHMENT DURING 1944

Estab- lished	Hatchery	Location	Species	Fry	Advanced Fry	Fingerlings					Year- lings and older	Total distrib- ution by species	Total distrib- ution by hatcheries
						No. 1	No. 2	No. 3	No. 4	No. 5			
1929	Antigonish.....	St. Andrews, N.S.	Atlantic salmon.....		435,000	340,000	55,000	67,700			13,912	897,700	2,772,697
1876	Bedford.....	Bedford, N.S.	Speckled trout.....		210,000	1,370,000	157,200	102,600	21,285			1,874,997	88,160
			Atlantic salmon.....		71,800	16,270						6,460	2,980
1937	Cobequid.....	Jackson, N.S.	Brown trout.....			2,950						15,750	97,600
			Speckled trout.....			15,750						75,900	91,650
1938	Coldbrook (f).....	Coldbrook, N.S.	Atlantic salmon.....		24,000	38,250	12,050	1,600				91,190	
1936	Grand Lake (f).....	Wellington Station, N.S.	Rainbow trout.....			88,080		143,302	3,523			146,825	238,015
			Atlantic salmon.....					275,000	70,000			404,109	
			Seabago salmon.....								50,169	3,316	
1937	Kejimikujik (f).....	New Grafton, N.S.	Speckled trout.....								39,770	202,910	449,255
			Atlantic salmon.....					202,910				3,316	
1912	Lindlof.....	St. Peters, N.S.	Speckled trout.....				330					1,424	204,324
			Atlantic salmon.....			140,500	710,000	27,430	73,000			783,000	
1902	Margaree.....	N.E. Margaree, N.S.	Speckled trout.....	340,000	390,000	550,000	185,060	540,000		606	791	2,130,000	1,137,387
1935	Mersey River (f).....	Liverpool, N.S.	Speckled trout.....			357,000	310,000	150,000	108,000			2,889,095	3,019,095
			Atlantic salmon.....				230,000	168,700		34,900	9,195	168,700	
1913	Middleton.....	Middleton, Annapolis County, N.S.	Speckled trout.....						5,220			5,220	173,920
			Atlantic salmon.....					390,000	50,000			440,000	
1929	Yarmouth.....	South Ohio, N.S.	Kamloops trout.....			8,000	7,500					15,500	
			Rainbow trout.....			100,000		58,067	5,154			63,221	518,721
1939	Charlo.....	River Charlo, N.B.	Atlantic salmon.....				55,000	85,000	129,500	19,710		389,210	
			Speckled trout.....	73,100							1,679	74,839	464,049
1928	Florenceville.....	Florenceville, N.B.	Atlantic salmon.....			151,800	759,820	47,500				959,120	
			Speckled trout.....			25,000	6,700	5,240				36,940	996,060
1880	Grand Falls.....	Grand Falls, N.B.	Atlantic salmon.....			1,320,000	80,000	40,000				1,401,982	
			Speckled trout.....			170,520					24,982	1,401,982	1,653,969
1874	Miramichi.....	South Esk, N.B.	Atlantic salmon.....	20,000	400,000	690,000	655,000	196,440			18,467	1,941,440	
			Speckled trout.....			51,490						71,490	2,012,930
1914	Saint John.....	Saint John, N.B.	Atlantic salmon.....		2,538,000	680,000	118,080					3,336,080	
			Speckled trout.....			20,000	12,300					32,300	3,368,380
			Rainbow trout.....			314,000						323,040	
			Seabago salmon.....				45,000	36,500		9,040		97,213	
1938	Cardigan (f).....	Cardigan, P.E.I.	Speckled trout.....	30,000		3,880	177,500			15,710	3	17,477	
			Atlantic salmon.....					69,650			13,777	225,512	663,242
			Rainbow trout.....					87,530			14,182	69,650	
1906	Kelly's Pond.....	Southport, P.E.I.	Speckled trout.....			237,000	5,830	134,490				87,530	
			Atlantic salmon.....			39,000	65,265					134,490	291,670
			Speckled trout.....					1,595				242,830	
				390,000	4,142,050	6,729,470	3,657,805	2,832,348	468,792	79,966	201,243	105,860	348,690
												18,501,674	

(f) Rearing station.

The fry and fingerlings included in this distribution were from collections in the autumn of 1943 and the spring of 1944.

# HATCHERY OUTPUT, BY PROVINCES, OF FRY, FINGERLINGS, YEARLINGS AND OLDER FISH DURING 1944

[illegible]

## NUTRITIONAL EXPERIMENTS

Nutritional experiments were continued as usual with fingerlings and enlarged to take in greater numbers of parent speckled trout. Rations that proved least efficient last year were discarded and several new ones added. In the experiments with fingerlings 15 different ingredients were used in various compositions and 78 tests made during the year. With parent stock 13 different ingredients were used and 25 tests made. Some of the rations used gave promising results at some hatcheries from the standpoint of survival, growth and cost of ration to produce a pound of fish. Most of the experimental feeding was with speckled trout.

## CHARLOTTE COUNTY LAKES EXPERIMENT

In continuation of the Charlotte County Lakes experiment, a co-operative effort between the Fish Cultural Branch and the Atlantic Biological Station of the Fisheries Research Board, the closures were removed and creel censuses were taken in Crecy, St. Patrick, Gibson and Welch lakes; and St. Patrick and Crecy lakes were stocked respectively with 1,060 and 675 marked speckled trout yearlings.

The creel census returns of 1944 again indicated poor productivity in the lakes with yields per acre of 1.93 pounds in Crecy lake and its outlet pond, 1.39 pounds in Crecy lake only, and less than a pound per acre in St. Patrick, Gibson, and Welch lakes. The extremely low production per acre in all eight lakes, as shown by the following summary, confirms the need of determining means to improve the fertility or productive capacity for trout in these and other lakes of similar type in the Maritime Provinces.

<i>Lakes</i>	<i>Census Year</i>	<i>Yield per acre (pounds)</i>
Limeburner .....	1942	0.4
	1943	0.1 (approximate)
Bonaparte .....	1942	1.1
Johnson .....	1941	0.9
	1942	0.1 (approximate)
Kerr .....	1941	0.4
	1942	0.2
St. Patrick .....	1943	0.7 (approximate)
	1944	0.98 (approximate)
Crecy .....	1943	2.0
Crecy and outlet pond.....	1944	1.93 (approximate)
Welch .....	1944	0.58
Gibson .....	1944	0.76 (approximate)

## SELECTIVE BREEDING

Selective breeding of speckled trout was continued to develop such characteristics as increased vitality, high yield, rapid growth, early spawning, colouration and general appearance. Outstanding pairs at the different hatcheries are mated and their progeny segregated. The progeny of the pairs in which survival is highest is retained for brood stock and periodically selected so long as they are profitable egg producers. The eggs of some of the pairs in which survival is highest at the eyed egg stage are exchanged by the several hatcheries. The average yield of the selected pairs and of the general groups are indicated in the reports of the respective hatcheries.

The range of small mouthed black bass in the Maritime Provinces was further extended by the transfers of adults from Lake Utopia, Charlotte County, N.B., to Micmac Lake, Halifax County, N.S., and to Shaw Lake, Saint John County, N.B. Experimental distributions of rainbow trout from four different sources and marked in different ways were made in tributaries of Sherbrooke Lake, N.S., and Big Salmon River, N.B. Smelt eggs collected in Lake Utopia, N.B., were supplied for distribution in Manito Lake, Saskatchewan.



During the year 4,573 Atlantic salmon were impounded. The average yield of eggs per female was 7,994 and for the individual ponds were: Morell 8,331, New Mills 7,461, Miramichi 6,730, River Philip 9,904, Sackville 5,927 and Margaree 9,848.

The Canadian National Railways, the Canadian Pacific Railway and the Dominion Atlantic Railway companies continued their generous assistance and co-operation by furnishing free transportation for shipments of game fish and game fish eggs with their attendants. The extent of this co-operation is indicated in the following summary:

Railway	Total mileage on trip passes	Number of passages	Mileage baggage car permits			Number of cases or cans			Number of permits
			Full	Empty	Total	Full	Empty	Total	
C.N.R.....	2,189	14	1,568	2,162	3,730	29	50	79	21
C.P.R.....	1,865	14	890	4,003	4,893	25	26	51	15
D.A.R.....	1,060	8	313	747	1,060	17	31	48	8
	5,114	36	2,771	6,912	9,683	71	107	178	44

NOTE.—Number of passages refers to transportation one way—a return trip counting as two passages. Number of permits refers to one way passages for cases or cans.

Operations generally at each establishment are referred to in the accompanying reports of supervisors and superintendents. Owing to conditions brought about by the war and a limited appropriation, no major new construction was undertaken and repairs and replacements were confined to essentials.

Collections, transfers and distributions are given to the nearest hundred in the summaries of operations at the respective establishments.

### *Standard Nomenclature and Computation Methods*

The Attorney General's Department, Victoria, B.C., the Department of Lands and Mines, Edmonton, Alta., the Department of Natural Resources, Regina, Sask., the Department of Mines and Natural Resources, Winnipeg, Man., the Department of Game and Fisheries, Toronto, Ont., the Department of Game and Fisheries, Quebec, Que., the Department of Mines and Resources (Federal) Ottawa, and the Department of Fisheries (Federal) Ottawa, which includes all Provincial and Dominion Government Departments now engaged in Fish Cultural operations, have agreed to and adopted the following nomenclature and computation methods for the product of their hatcheries:

### *Nomenclature*

#### *1. Egg:*

The general term "egg" covers the period from spawning or stripping until the egg is hatched.

#### *Sub-Divisions—*

##### *Green Eggs—*

Eggs from the time they are spawned or stripped until they have become firm and have ceased to absorb moisture.

##### *Water hardened eggs—*

Eggs that are firm and have ceased to absorb moisture.

##### *Eyed eggs—*

Eggs in which the eyes or the dark eye-spots are clearly visible.

2. *Fry:*

Fish from the time they are hatched until the yolk sac is completely absorbed.

3. *Advanced Fry:*

Fish for a period of two weeks following the complete absorption of the yolk sac.

4. *Fingerlings:*

Fish from two weeks after complete absorption of the yolk sac until they are one year old from date of hatch.

Sub-divisions of fish during their first year, when they are classified as fingerlings, is based on age from the date on which they are hatched. While age has been adopted as the primary basis for the sub-division of fingerlings, each Department in addition to age is free to give the size, length or weight of its hatchery product or to describe it in any other way.

5. *Yearlings:*

Fish from one to two years old from date of hatch.

## 6. Fish older than yearlings are indicated according to age in years from the date of hatch.

### *Computation Methods*

1. *Eggs:*

Volumetric measurement in water based on three or more sample counts of the contents of a unit measure.

2. *Fry:*

Computation by estimate checked against the egg measurement with egg losses and visible fry losses deducted.

3. *Advanced Fry:*

In the early stages computation by estimate checked against egg measurement with egg losses and visible fry losses deducted. In the later stages similar computation checked by sample counts.

4. *Fingerlings:*

In the early and medium stages computation by weighing in water based on sample counts. In the later stages with larger fish, computation by weighing in water based on sample counts if the numbers are too large to count, otherwise by actual count.

5. *Yearlings and Older Fish:*

By count.

### MARITIME PROVINCES

#### *Senior District Supervisor of Fish Culture, James Catt*

In spite of a necessarily limited appropriation and difficulties in obtaining adequate labour and supplies, expansion of the Fish Culture Service was not entirely suspended. Perhaps the most important innovation of the year was the conference of hatchery superintendents at Saint John to discuss their respective problems.

Staff operations included hatchery inspections, examinations of lakes and streams, collection of land-locked salmon, speckled trout and smelt eggs, collection and distribution of small mouthed black bass, selection of waters for

experimental distributions of four strains of rainbow trout, and preliminary surveys of certain salmon and trout streams with a view to future improvement. To obtain a clearer picture of the inland waters certain areas were traversed with Doctor A. W. H. Needler, Director of the Atlantic Biological Station, St. Andrews. Doctor M. W. Smith of the same station in co-operation with Supervisor F. A. Tingley selected three lakes in New Brunswick and four in Nova Scotia for further tests in economic stocking.

At the request of Doctor Needler samples of red and of white fleshed speckled trout were forwarded to Doctor W. S. Hoar, University of N.B., for comparative determination of their riboflavin values. He reported that: "There was very little difference in the Vitamin B<sub>2</sub> content of the two types of muscle. The red flesh contained 2.5 micrograms of riboflavin per gram of dry tissue, while the white flesh contained 3.2 micrograms. This is not so very different, and is of the same general order as values obtained for salmon." The samples, obtained by Supervisor A. P. Hills, included white fleshed wild stock, white fleshed hatchery stock fed artificial diets, and red fleshed stock of hatchery origin liberated in Howe Lake, Saint John, in 1943.

In the latter part of April an inspection of the spawning grounds of Var. "A" smelts, the so-called "lath edgings," of Lake Utopia indicated the run to have been heavier than usual. Further investigation determined the run of Var. "C" smelt to have been relatively small but Var. "B" spawned in greater numbers than observed heretofore. Some of the last named remained on the spawning grounds until early June—considerably later than is customary.

As smelt eggs were required for planting in Manito Lake, Saskatchewan, under the direction of Doctor D. S. Rawson, a brief survey of the Gaspereau River, Hants Co., N.S., was made but the spawning grounds could not be located in the limited time available before the ova became too far advanced for safe shipment; however, on June 3 approximately 2 quarts of eyed eggs, Var. "B" Lake Utopia were obtained and forwarded to Saskatchewan. One quart of eyed eggs of the same variety was again laid down in the main spring feeder affluent to Wheaton (Bocabec) Lake, Charlotte Co., N.B.

The installation and operation of a trap at the mouth of Trout brook, Lake Utopia, from early May to late November produced interesting and valuable results. It served a fourfold purpose—the capture for distribution of small mouthed black bass ascending the brook; the protection from these fish of young trout descending the brook which drains the watershed constituting the main trout nursery for Lake Utopia; the capture of mature speckled trout in the fall for the collection of their ova; and the collection of data in connection with the species of fish running the brook and the periods of their migration.

The trap was so set as to permit the descent of small trout during the earlier part of the year at the same time preventing the ascent of large fish.

At the end of the bass spawning season the intake was closed and not again opened until late September—although following the hurricane of September 15 it was rendered inefficient for several days.

During the spring and fall operations small mouthed black bass were taken and transferred to Micmac Lake near Dartmouth, N.S., and to Shaw Lake watershed near Saint John, N.B. The trap also caught a large number of coarse fish including suckers, cyprinids, yellow perch, sun fish, ells, Var. "A" smelts and ling. In regard to the last named species two specimens were taken in the spring and more than 20 in the fall, a much greater number than had been trapped in Trout brook in any one season in the last two decades. Many of the fall specimens were gravid and some contained large speckled trout in their stomach. The ling may have caught these after entering the trap. In late October and early November an increasing number of trout were spent before



their capture; their partly mended condition was indicative of an undiscovered spawning ground in the lake.

In the Saint John area it is observed that the largest catch of landlocked salmon on record was made in Chamcook Lake watershed in the late spring and early summer. The vast majority of these were marked and definitely a hatchery product. Following the connection of Limeburner to upper Chamcook Lake by means of a dugway or ditch the range of Chamcook salmon has expanded to include the Limeburner Lake watershed in which the capture of the species was for the first time recorded this season. Brown trout continue in abundance in Loch Lomond, Terreo Lake, and other parts of the Mispék watershed as well as in Little River. Distributions of landlocked salmon in Grand Lake, N.S., has resulted in an increased catch by anglers. The weight of these fish taken in 1944 was double that of the preceding year.

Reliable information indicates that a heavy run of Atlantic salmon smolt in 1943 and a smaller run in 1944 descended through Dick's Lake, on the Falls brook branch of Big Salmon River, Saint John and Kings Counties, N.B. These fish were the result of stocking the headwaters of Falls brook. A waterfall below Dick's Lake presents a complete barrier to the ascent of salmon, thus definitely fixing the smolt taken above it as the result of hatchery stocking.

The speckled trout fingerlings liberated in Howe Lake, Saint John County, in 1943 produced unusually fine yearlings. In June they had reached an average weight of 1 pound for 11½ inches of length.

The experimental introduction of four varieties of rainbow trout, including fall spawners and Kamloops, into unscreened and open waters, constitutes a very interesting test. The areas selected are covered by the headwaters of the north branch of the Lahave River, N.S., and by the Main, Reardon, and Falls brook tributaries of the Big Salmon River, N.B. Each of three of these groups was marked by clipping a different fin. The fourth group was left unmarked; thus recaptures should indicate the stock best adapted to the water.

Maritime distributions were smaller than usual. This was the result of the poor quality of trout ova laid down in 1943. The loss in eggs followed a heavy loss in brood stocks which appears to have been caused by the unexpected toxicity of frozen sardines held too long in cold storage.

The quality of the parent stock and the percentage of egg fertility is much higher than it was at the same time last year.

Total distributions for the year were approximately as follows:

	<i>Fry and Fingerlings</i>	<i>Yearlings and Older Fish</i>
Speckled trout.....	4,016,200	98,000
Atlantic salmon.....	13,863,800	84,150
Sebago or land-locked salmon.....	3,700	19,090
Rainbow trout.....	394,800	3
Kamloops trout.....	15,500	—
Brown trout.....	6,460	—
Small mouthed black bass (mature wild fish) .....	—	82

Ova collections were obtained from Atlantic and landlocked (sebago) salmon, speckled trout, rainbow trout, and smelt.

Importations include rainbow, Kamloops and brown trout eggs. Four thousand five hundred and seventy-three wild parent Atlantic salmon held at the Margaree, Miramichi, New Mills, Morell, River Philip and Sackville ponds yielded approximately 23,000,000 green eggs.

Two hundred and sixty-three wild sebago salmon from the watersheds of Grand Lake, N.S., and Chamcook Lakes, N.B., yielded 98,000 eggs.

Nearly 538,000 speckled trout eggs were obtained from wild fish captured in Prince Edward Island, Cape Breton, N.S., Charlotte Co., and Burnt Hill brook near Florenceville, N.B.

Hatchery stocks produced approximately 29,000,000 speckled trout eggs, 87,500 landlocked (sebago) salmon eggs and 6,500 Atlantic salmon eggs. This



last group obtained from six females, four years old, held at Saint John hatchery is the first instance of the species being raised to maturity and reproducing at any Maritime hatchery; possibly it is without parallel anywhere. A careful study of their diet and conditions under which these fish were held may be of importance in obtaining a higher percentage of fertility in landlocked strains reared in artificial ponds.

As the opportunity occurred, some meetings of the branches of the Provincial Fish and Game Protective Associations, including those held at Saint John, Springhill, and Truro, were attended. Generally speaking, the co-operation of these branch associations took a very practical form in assisting in distributions and surveys and supplying needed information. Such assistance is much appreciated. Officers of those Provincial Departments administering the several regulations covering fish and game were kind enough to offer their services where needed and possible. This was particularly so in the Charlotte and Saint John County areas of New Brunswick.

Co-operation between the Administrative and Fish Cultural Officers of this Division was excellent in spite of the increasing duties of the former branch.

An increased degree in the exchange of ideas and information between the Directors and staffs of the Fisheries Research Board's Stations at Halifax and St. Andrews and the Fish Cultural Staff is noted with satisfaction, and has led to joint execution of certain plans and the formulation of others requiring future co-operative effort.

#### *District Supervisor of Fish Culture, F. A. Tingley*

Early in May a trap was set in the mouth of Trout brook, Lake Utopia, to capture small mouthed black bass, and between May 11 and June 6 it took 66. Of these 61 were transferred on the last mentioned date and liberated in good condition in Micmac Lake, one of the Dartmouth waters, Halifax County, N.S. The capture and transfer of this species from Lake Utopia serves a dual purpose, i.e., protection of the yearling speckled trout that descend Trout brook in the spring, and provision of a nucleus of a population of game fish where none such existed in waters unsuited for trout. Twenty-one bass subsequently captured at the same location were transferred to Shaw Lake, Saint John County, N.B.

In July and August, in collaboration with Doctor M. W. Smith, of the Atlantic Biological Station, selection of the following seven lakes for a trout stocking test was made:—in New Brunswick, Loch Lomond and Black near Campbellton, Restigouche County, and Mechanic's or Pollett, Kings County; in Nova Scotia, Sutherland, Cumberland County, Copper, Antigonish County, Grant, Pictou County and O'Law, Inverness County. The proposed tests in these lakes are designed to determine (1) the approximate natural production of the waters by comparison of the numbers of native trout captured against the return from known numbers of marked hatchery stock, (2) the comparative efficiency of stocking with hatchery trout of three size groups and (3) correlation of results obtained from stocking with the characteristics of the different waters involved. Distribution of the first two sized groups has been made in all except Pollett Lake. Assistance was given Supervisor Catt in August in an examination of Point Wolf, Little Salmon and Big Salmon Rivers for selection of a stream in which to make experimental distributions of rainbow trout. The Big Salmon was selected and rainbow distributed.

On August 14 the trap net was reset in the mouth of Trout Brook, Lake Utopia, with a view to obtaining eggs from early spawning speckled trout. Abnormal water conditions damaged the trap temporarily and allowed the early run to ascend to the spawning grounds, but a collection of 119,900 eggs was obtained from the later running trout.

Assistance was also given with the sebago salmon egg collection at Chamcook and Gibson Lakes. In addition to the usual set-up at Chamcook and the trap established at the outlet of Gibson Lake, a picket trap was built in Gibson brook about midway between Gibson and Upper Chamcook Lakes. Two factors that may have reduced the numbers of spawning fish were (1) an exceptionally heavy catch of sebago salmon in Chamcook Lake during the angling season and (2) escapement of salmon to Limeburner Lake through a channel cut into Upper Chamcook Lake in 1942.

The following establishments were inspected:—Antigonish, Margaree, Lindloff, Bedford, Cobequid, Grand Lake, Yarmouth, Middleton, Mersey, Kejimikujik and Coldbrook—two of them twice. Conferences called by the fishery supervisors were attended at Saint John, May 6, St. Stephen, May 19, Kentville, December 14, and the conference of hatchery superintendents at Saint John, May 16 and 17.

### *District Supervisor of Fish Culture, A. P. Hills*

During the year the Coldbrook, Middleton, Nictaux, Stevens, Kejimikujik, Mersey, Yarmouth, Florenceville, Grand Falls, Charlo, Miramichi, Kelly's, Cardigan, New Mills, Morell, Margaree, Lindloff, Antigonish and Cobequid establishments—six of them twice—the Margaree salmon retaining pond, Burpee and Tweedie Meadow brooks, were inspected. Stripping operations were partially observed at Antigonish, River Philip and Margaree plants. The annual meeting of the New Brunswick Guides Association at Fredericton, March 29, Fish Cultural Officers' conference at Saint John, May 16 and 17, Fishery Officers' conference at St. Stephen, May 19, a meeting of the local Fish and Game Committee at Middleton, August 28, and of the Springhill Branch of the Nova Scotia Fish and Game Protective Association, November 19, were attended. In April I accompanied the Civil Service representative who held oral examinations for hatchery assistants in New Brunswick and Nova Scotia. In May I assisted the Senior District Supervisor of Fish Culture in examining Annapolis and Nictaux Rivers, Evans brook, Payson's Meadow, Klondyke and Sullivan flowages in connection with stream improvement proposals. A further examination of Annapolis and Round Hill Rivers was made in August. Other waters examined, some superficially, were: Howe, Kelly, and Dark Lakes, New Brunswick; Blooming Point pond, Prince Edward Island; and Hollahan Lake, Salmon River (Truro), Parrsboro Aboiteau, Black and Dry Lakes and tributaries of Sherbrooke Lake, Nova Scotia. I also assisted in the collection and transfer of small mouthed black bass from Lake Utopia to the Dartmouth and Shaw Lake watersheds and with collection and shipment of smelt eggs to Saskatchewan.

Weirs for measuring the flow of water were constructed at Springdale, Calamingo and Teackle's brooks and periodic inspections made of them. The marking and distribution of four different strains of rainbow trout in streams tributary to Sherbrooke Lake, Nova Scotia, was partially supervised and some assistance given in connection with the collection of speckled trout eggs from wild stock at Lake Utopia, New Brunswick.

### ANTIGONISH HATCHERY

#### *W. D. Turnbull, Superintendent*

The hatchery ponds produced 10,944,600 speckled trout eggs which were all laid down in Antigonish hatchery. This collection was supplemented by receipt of 1,001,000 Atlantic salmon eggs from Cobequid hatchery March 25 and 5,000 speckled trout eggs (selected stock) from Margaree February 14. In October

35,000 speckled trout No. 4 fingerlings were sent to Grand Lake rearing station. Distributions for the year were 897,700 Atlantic salmon and 1,875,000 speckled trout of which 38,772 trout were marked by fin clipping. In selective breeding 30 pairs of three year old trout averaged 4,040 eggs per female as against 2,662 in the general group of the same age; likewise 17 pairs of 2 year selects averaged 3,206 per female as against 1,945 in the general group. A new plank walk was laid along the longitudinal ponds and the roof of the main hatchery building was repaired and tarred.

#### BEDFORD HATCHERY AND SACKVILLE RIVER SALMON-RETAINING POND

*George Heatley, Superintendent*

On February 18 ten thousand brown trout eggs were received from Normandale hatchery, Ontario, and in October and November 592,700 Atlantic salmon eggs from Sackville pond and 1,040,200, same species, from River Philip pond. Outgoing shipments of Atlantic salmon were: 300,000 eggs to Yarmouth March 20, 308,000 fry to Mersey in May and June and 539,000 to Grand Lake from May to September. Distributions direct from Bedford were 88,200 Atlantic salmon, 3,000 speckled and 6,460 brown trout. A cribwork 95 feet long was built along the river bank to protect the hatchery grounds from freshet conditions and improve their appearance. Thirty-two thousand salmon eggs are being held at the disposal of Doctor Hayes, Dalhousie University. Transfers and distributions to and from Grand Lake rearing station, distributions from Coldbrook ponds and transfer of black bass from Lake Utopia to Lake Micmac were made by the Bedford hatchery staff. A convenient device for weighing fish for transfer or distribution was developed and the inside of the hatchery was cleaned and painted. A general increase in the catch of both salmon and trout was reported in this district.

At the Sackville River pond between October 9 and 25 two hundred and nine Atlantic salmon averaging 8.5 pounds in weight were taken, of which 100 females were stripped, October 31 to November 9, yielding 592,700 eggs. Due to the unusually dry season and low water, a considerable number of fish that were in evidence in Bedford Basin evidently migrated elsewhere instead of ascending the Sackville River.

#### COBEQUID HATCHERY AND RIVER PHILIP SALMON-RETAINING POND

*P. B. Stratton, Superintendent*

In February and March speckled trout eggs were received—269,500 from Lindloff and 165,000 from Margaree, including 5,000 from selected stock; in November 4,339,700 Atlantic salmon eggs were obtained from River Philip pond. Outgoing shipments of Atlantic salmon eggs in March and April were 1,001,000 to Antigonish, 400,400 to Middleton and 76,800 to Saint John hatchery. Distributions for the season were 15,750 Atlantic salmon and 75,900 speckled trout. Gravel and debris that had accumulated in the water supply pond and in the river channel above and below the pond were removed. All pipe lines, tanks, troughs and movable equipment were disinfected with strong solutions of Lo-Bax and the water supply and rearing ponds with copper sulphate. A new chimney was built in the workshop, new retort tanks installed in the cold storage and a concrete walk made at the dwelling. Repairs were made to the chimneys of the hatchery and the dwelling, the driveway at the dam widened three feet and necessary minor repairs were made. The clay lining of five of the circular ponds was removed and replaced with gravel. Assistance was given the Fisheries Research Board in the experimental stocking of Pollett River, Petitcodiac. The hatchery interior, the exterior of the dwelling and wood shed



were painted and the grounds improved generally. Checking the condition of the fish during transit was facilitated by painting white the inside bottoms of the distributing barrels.

The main dam at the River Philip salmon retaining pond, which had been damaged considerably by ice and freshets, was repaired during the low water period of the summer. The caretaker's quarters and spawning shed were painted.

One thousand three hundred and seventy-six salmon averaging 16.75 pounds were taken from October 10 to November 18. From 720 females stripped, November 8 to 22, 7,131,000 eggs were secured and laid down as follows: Cobequid 4,339,700, Bedford 1,040,200, Doctor Hayes, Dalhousie University, in care of Bedford, 4,500, Middleton 1,000,400 and Yarmouth hatchery 746,200. During October the run of salmon was much below the average but improved in the early part of November. In the run that reached the dam, females and males were in the proportion of about 3.5 to 1.

A 21-pound female salmon bearing tag K2125 was caught in the Wallace River, near Pugwash, on May 24, 1943. This salmon was tagged and liberated below the River Philip pond on November 10, 1940, when it weighed 12½ pounds after it was stripped, and was 36 inches long.

#### COLDBROOK REARING PONDS

*E. Barrett, Superintendent*

After opening on May 2, the usual work of regravelling, disinfecting the ponds and connecting the water supply was carried on in preparation for receipt from Middleton of 157,200 rainbow trout, May 18 to July 4, and 100,000 Atlantic salmon May 31 and June 1. With the assistance of the staffs and trucks from Bedford and Middleton hatcheries 91,200 Atlantic salmon and 146,800 rainbow trout were distributed. Sixty-five thousand one hundred and fifty-one of the latter were marked by removal of the adipose and one side fin before being planted in tributaries of Sherbrooke Lake. The painting of the outside of all buildings was completed, a new board walk laid from the front of the dwelling to the lower end of the lawn, one new foot trough built and installed for the outside rearing troughs and a trough built for use while marking fish. Trout fishing in the district is reported to have definitely improved during the last five years. Members of the Kings County Fish and Game Association and Fishery Officers rendered their usual valuable assistance.

#### GRAND LAKE REARING PONDS

*W. H. Cameron, Superintendent*

Bedford hatchery from May to September supplied 539,000 Atlantic salmon and Antigonish in October 35,000 speckled trout. Collecting operations at Rawdon River and Waverley Run in October and November resulted in a catch of 80 sebage salmon, averaging 2 pounds in weight, 46 of which were females yielding 58,100 eggs. Of the 80 caught in the traps 38 or 47.5 per cent bore the Grand Lake pond mark. In addition, 58 marked seabagos were taken by anglers in Grand Lake, 38 in Lake William and 2 in Shubenacadie River. At the hatchery ponds 209 sebage females in November produced 87,600 eggs. Distributions for the season were 39,800 speckled trout, 5,316 sebage salmon which were marked by removal of the adipose and right ventral fins, and 404,200 Atlantic salmon, 4,769 of which were marked by clipping the adipose and left ventral fins. A small percentage hatch was obtained again from eggs of sebage salmon pond stock and as in the two previous years the resultant fry made better growth than the progeny of the wild stock. The



circular and long ponds were repaired, part of the interior and all the exterior of the dwelling and icehouse were painted or stained. A new shelter of dressed lumber was built over the hatching trough and stained. The road from the highway to the ponds was gravelled and the bridge renewed.

#### KEJIMKUJIK REARING PONDS

*T. K. Lydon, Superintendent*

In May and June 15,600 speckled trout fingerlings were supplied by Yarmouth hatchery and 295,000 Atlantic salmon by Middleton. From these 1,424 trout and 202,900 salmon were distributed, 1,094 of the trout being marked by removal of the adipose and left pectoral fins. Six large and four small troughs were used in further tests of water flowage to control white spot disease, a new bridge built across the brook leading to the circular ponds, the water supply dam repaired and deadwood above it removed, four experimental rearing troughs built, site for troughs graded and levelled, some painting and varnishing done, most of the road graded and repaired and grounds improved generally. Trout fishing is reported holding up well in the district.

#### LINDLOFF HATCHERY

*W. T. Owens, Superintendent*

Speckled trout egg collections from the hatchery ponds amounted to 889,700 and from McRae Lake 122,100. Freshet conditions at the latter place interfered with collections; disease and failure of transferred McRae Lake females to produce, all militated against a larger collection from the ponds. During the fall of 1943 female speckled trout from McRae Lake were transferred to the hatchery ponds and fed for a year to ascertain results. Only approximately 20 per cent of these produced eggs in 1944. The spawning period was from October 17 to November 10 as compared to last year's period for the same group from October 6 to 18. The eggs from these fish are pale in colour of poor quality and low fertility, indicating that proper food is an important factor in the production of better quality eggs. However, individuals of this group made a good gain in weight increasing from 2.8 ounces in October 1943 to 8 ounces in October 1944. Their average egg yield also increased from 215 to 394 per female. The crossing of McRae Lake females with large male speckled trout, hatchery stock, during 1943 proved to be a definite advance in fish culture. The resultant fingerlings still on hand are equal in quality to, if not better than, any fingerlings ever produced at this hatchery.

Five thousand speckled trout eggs from selected stock were received from Margaree in February and 1,061,200 Atlantic salmon eggs from Margaree salmon pond in November. In March 269,500 speckled trout eggs were shipped to Cobequid hatchery. Distributions for the season were 783,000 Atlantic salmon and 354,400 speckled trout of which 791 were marked by removal of the adipose and left pectoral fins. In addition 2,641 marked McRae Lake trout were distributed in Lindloff Lake, 1,304 of which had been held in the hatchery ponds for one year. The balance 1,337 was a direct transfer between the two lakes. In selective breeding twenty-one pairs of selected three year old trout averaged 1,927 eggs per female as against 1,345 in the general group of the same age. One hundred and fifty-five McRae Lake wild females held over in hatchery ponds from 1943 were spawned as a group and their eggs fertilized with three year hatchery males. A total of 69,508 eggs so taken are being segregated for selective breeding purposes.

A new concrete floor was laid in the hatchery, 16 large rearing troughs 13' x 24" x 15" and one 50 foot supply trough were installed on a new 55 foot

bench prepared to accommodate them. The hatchery brook was deepened, widened and walled with stone cribbing where required, a 200 foot site for ponds was benched and cribbed with stone opposite the hatchery building. New sills and screen frames were installed in four of the circular ponds, repairs made to concrete centres of these ponds and 24 pond shades made and painted. Painting of the icehouse and garage, commenced last year, was completed and improvements made to grounds and dwelling. Kytes Lake offered excellent early fishing, the River Tillards fished well during July and early August, good catches of speckled trout were reported from Mary Ann's Lake and Catalogne Lake was reported to have offered better than average fishing during the year.

#### MARGAREE HATCHERY

*J. W. Heatley, Superintendent*

The hatchery ponds yielded 2,783,400 speckled trout eggs, and 2,474,300 Atlantic salmon eggs were received (November 17-December 7) from Margaree Salmon pond. In February 5,000 speckled trout eggs from selected stock, three year group, were shipped to each of the following: Lindloff, Antigonish, Florenceville, Saint John and Cobequid hatchery. In March 300,000 speckled trout eggs were forwarded to Kelly's pond hatchery and 160,000 to Cobequid. Distributions for the year were, 2,130,000 Atlantic salmon and 889,100 speckled trout of which 19,095 of the latter were marked by fin clipping.

In selective breeding 38 pairs of selected three year old trout averaged 1,925 eggs per female as against 1,026 per female in the general group of the same age. Ten small hatching and four large rearing troughs were made, the lower pond of the "S" series was widened and new dams built at the head and foot, a centre outlet was made in the large pond at the hatchery, corners rounded, and a new six inch pipe line laid to this pond. Some increase was noticed over last year in the number of salmon on the spawning grounds. Good angling was reported in the Margaree area, North River district and various lakes in the New Boston area. The Fishery Supervisor and his officers gave splendid co-operation whenever called upon for assistance.

#### MARGAREE SALMON-RETAINING POND

*J. P. Chiasson, Superintendent*

In accordance with the usual practice, the salmon for this pond were purchased from the Margaree Harbour Salmon Fisheries Association. Preparations for seasonal work began September 13 and consisted of cleaning pond, repairing pontoons, caulking boat and repairing fence around pond and the pond gate. The net was fished continuously from September 26 to November 4 taking 497 salmon averaging 10.3 pounds. Only one fish was lost during the retention period. From 359 females stripped, November 16 to December 6, three million five hundred and thirty-five thousand five hundred eggs were taken and allotted, 2,474,300 to Margaree hatchery and 1,061,200 to Lindloff. An 18 pound female salmon bearing tag number K3062 was caught at White Rock, St. Lawrence Bay, Victoria County, N.S., on June 28, 1943, that was tagged and liberated at the Margaree pond on November 19, 1940 when it weighed 7 pounds after it was stripped and was 31 inches long. Tag number K3124 that also was attached to a stripped salmon liberated at Margaree Harbour in 1940 was reported from Saint John having been found in the nape of a haddock caught on November 1, 1941 in twenty fathoms two miles off Mispek, N.B.

## MERSEY RIVER REARING PONDS

*C. E. Harding, Officer-in-Charge*

After all necessary repairs had been made to the screens and ponds, 11,000 speckled trout fingerlings were received from Yarmouth May 26, and 308,000 Atlantic salmon fry from Bedford May 31 to June 16. The output for the season was 168,700 Atlantic salmon and 5,200 speckled trout. The catch of trout by angling compared favourably with other seasons. The two long ponds received a good coating of gravel on sides which filled all holes and stopped several of the leaks. The platform of the bridge as well as the floor of the camp and porch were painted. Further improvements were made to the grounds and the experimental feeding troughs were moved to a more suitable place where they are in sight of the camp. So long as the trunks were kept white-washed the trees growing along the banks of the ponds were not cut by beavers as they were last year. Valuable assistance was rendered throughout the season by the staffs of the Nova Scotia Power Commission and the Mersey Paper Company, by the local Fisheries Inspectors, Fish Wardens, and Mr. F. Gray of Middle Lahave.

## MIDDLETON HATCHERY, STEVENS PONDS AND NICTAUX REARING STATION

*F. M. Millett, Superintendent*

Eyed eggs received during the season were—Rainbow trout 75,000 January 20 from Bourbon, Missouri, 200,000 April 6 from Cape Cod Trout Company, Wareham, Massachusetts, 69,800 May 23 and 25 from Saint John hatchery (Crooked creek strain) and 150,000 June 30 from Lloyds creek hatchery, B.C. (Kamloops variety)—the rainbow from Bourbon are autumn spawners, the others spring spawners; speckled trout 250,000 March 29 from Saint John; and Atlantic salmon 400,400 April 4 from Cobequid. Green eggs received in November were—speckled trout 1,000,000 from Saint John and Atlantic salmon 1,000,400 from River Philip. Outgoing shipments of young fish May 18 to July 4 were—295,000 Atlantic salmon to Kejimikujik, 100,000 same species and 157,200 rainbow trout to Coldbrook. Distributions consisted of 440,000 Atlantic salmon, 15,500 Kamloops trout and 63,200 rainbow trout of which 30,154 of the last mentioned were marked by removal of the adipose and right pectoral fins and planted in tributaries of Sherbrooke Lake. The new icehouse and feed-room building was completed and given one coat of paint, the old icehouse being converted into a temporary storeroom and work shop, four new hatching troughs were made, part of the interior of the hatchery was painted, the hatchery roadway and the grounds were improved, the dykes between the upper sections of Stevens ponds were gravelled, and new roofing was put on the watchman's quarters. Reports from sportsmen indicate that trout fishing in the district for the past two years has been exceptionally good. The hatchery truck and part of the Middleton staff assisted with the distributions from Coldbrook rearing ponds.

Nictaux rearing station was not operated this season but the buildings were painted, bushes cleared from around the hatchery and an accumulation of debris removed from the vicinity of the intake pipe.

## YARMOUTH HATCHERY

*F. F. Annis, Superintendent*

The yield from the hatchery ponds amounted to 286,800 speckled trout eggs. Eggs received from other points were 300,000 Atlantic salmon from Bedford March 21 and 746,200, same species, from River Philip pond November



15. Outgoing shipments of speckled trout fingerlings in May were—11,000 to Mersey and 15,600 to Kejinkujik. Distributions for the season were—74,800 speckled trout and 389,200 Atlantic salmon; of these 532 trout and 2,710 salmon were marked by removal of the adipose and right ventral fins. In selective breeding six pairs of two year old speckled trout yielded 1,385 eggs per female as against 735 in the general group of the same age. Hatching room, feed room and two halls opening off the hatching room were repainted, repairs made to garage doors and considerable progress was made in the excavation for two circular ponds on the lower hatchery lot. Anglers reported that there was evidence of considerable numbers of trout and that fishing was fairly good in the district.

#### CHARLO HATCHERY

*R. O. Barrett, Superintendent*

The speckled trout from the hatchery ponds produced 670,900 eggs—an increase of 149,000 over the previous year and more than double the collection of 1942. Receipt of eggs from other points were—300,000 Atlantic salmon from Kelly's, March 2 and 1,805,600 Atlantic salmon from New Mills pond, October 26 to November 9. One outgoing shipment of 100,000 speckled trout eggs was made to Miramichi April 25. Output for the season consisted of 959,100 Atlantic salmon and 36,900 speckled trout, of which 6,240 of the latter were marked before being liberated into Black and Loch Lomond Lakes. In selective breeding 18 pairs of three year old speckled trout averaged 2,192 eggs per female as against 1,356 in the general group of the same age. Ten circular ponds were lined with three inches of cement, the brood stock pond was repaired with clay where it had blown out, the woodwork inside of main and sub-hatchery and the verandah of dwelling were painted. A swamp flowage known as Henry's Lake and presumably barren, whose outlet is blocked by a dam, was stocked in 1941 with 200 speckled trout fingerlings. In September, 1943, they measured 16 inches long and weighed up to 2½ pounds. In May, 1944, five fish were taken averaging 2 pounds 10 ounces and the largest 3¼ pounds with lengths up to 18 inches. Exceptionally good salmon angling was again reported on the Restigouche River.

#### FLORENCEVILLE HATCHERY

*J. M. Butler, Superintendent*

The hatchery ponds yielded 552,700 speckled trout eggs this year which were augmented by 10,000 of the same species taken from wild stock captured in Burnt Hill brook. Egg shipments received consisted of 5,000 speckled trout (select stock) February 26 from Margaree, 505,000, same species, March 4 from Saint John, 600,000 Atlantic salmon March 25 from Miramichi hatchery, 836,000, same species, October 27 from Miramichi salmon pond and 2,036,400 speckled trout November 7 and 11 from Saint John. Distributions for the year were 1,465,000 Atlantic salmon and 189,000 speckled trout of which 18,370 trout were marked by removal of the adipose and left pectoral fins. In selective breeding 14 pairs of selected three year speckled trout yielded approximately 1,496 eggs per female as against 874 per female in the general group of the same age.

Twenty-six new long pond shades were made, parts of exteriors of main hatchery, dwelling and garage painted, minor repairs made to ponds and equipment and grounds improved generally. Angling has been reported much improved in Davidson, Brown and Cranberry Lakes, Little Presquile River, Debec, Gibson Mill, Dead, Longs and Burnt Land brooks, Glassville and Johnville Beaver ponds and River des Chutes. A representative of the Fredericton



Fish and Game Association assisted to a considerable extent and accompanied practically all the distributions in York County, the local Fisheries Supervisor went with many of the local distributions and the local fishery wardens helped to locate new distributing grounds and assisted in liberating fish.

## GRAND FALLS HATCHERY

*W. A. McCluskey, Superintendent*

In March 800,000 Atlantic salmon eggs were received from Miramichi and 1,000,000 speckled trout eggs from Saint John hatchery. In October 937,200 Atlantic salmon eggs also arrived from Miramichi salmon pond. Distributions for the season were 71,500 speckled trout and 1,941,400 Atlantic salmon. This year the exteriors of all hatchery buildings were painted, part of the lawn reseeded and fertilized and the garages recovered with tar roofing. Assistance in making distributions, as in the past, was given by the Grand Falls branch of the Fish and Game Protective Association.

## MIRAMICHI HATCHERY AND SALMON-RETAINING POND

*Frank Burgess, Superintendent*

In April 100,000 speckled trout eggs were received from Charlo hatchery and in October and November 7,528,300 Atlantic salmon eggs from Miramichi salmon pond. In March Atlantic salmon eyed eggs were transferred: 120,000 to Glenora hatchery, Ontario, 50,000 to Craig Brook hatchery, Maine, 800,000 to Grand Falls and 600,000 to Florenceville hatchery. Distributions for the season were 32,300 speckled trout and 3,336,100 Atlantic salmon. More salmon were reported on the spawning grounds this year than last. Fly fishing was good in all branches of the Miramichi and commercial and set-net fishermen in the district had a good season. The exterior of the spawning building was painted and the garage re-aligned and painted.

The parent salmon for the Miramichi pond as usual were purchased by tender and contract, and from September 9 to 25 one thousand eight hundred and fifty fish averaging 8.3 pounds in weight were impounded. Between October 19 and November 8, one thousand three hundred and eighty-two females were stripped yielding 9,301,500 eggs which were allotted: 7,528,300 to Miramichi, 937,200 to Grand Falls and 836,000 to Florenceville. Two salmon bearing tags numbers K3570 and 1149 (celluloid) that were stripped and liberated at the pond in 1943 were reported in May 1944, one from Sillikers and the other from lower Newcastle, N.B.

## NEW MILLS SALMON-RETAINING POND

*William White, Superintendent*

Between May 25 and July 19, three hundred and ninety-four Atlantic salmon, averaging 15.3 pounds, purchased from 15 commercial fishing stands of the district, were delivered and impounded at the New Mills pond. At stripping time, October 25 to November 9, two hundred and forty-two females yielded 1,805,600 eggs which were all laid down in the Charlo hatchery. Only six salmon were lost during the retention period from May to November.

## SAINT JOHN HATCHERY

*K. G. Shillington, Superintendent*

Last year's record collection of speckled trout eggs from the hatchery ponds was again exceeded with a take of 12,954,900 of which 5,764,500 were laid down in Saint John hatchery, 1,000,000 sent to Middleton, 2,036,400 to Florenceville

and the balance, 4,154,000 planted in Spring brook. The ponds also produced 109,100 rainbow trout and 6,500 Atlantic salmon eggs—the latter from four year old pond-reared parents. Receipt of eggs from other points were—77,800 rainbow trout (autumn spawners) January 19 from Bourbon, Missouri, 5,000 speckled trout, selected stock, February 25 from Margaree, 700,000 Atlantic salmon March 1 from Kelly's, 76,800 same species April 14 from Cobequid, 104,000 rainbow April 19 from Warcham, Massachusetts, 119,900 speckled trout October 9 to November 22 from Lake Utopia, 26,000 sebago salmon November 10 to 23 from Chamcook lakes and 14,400 same species, November 11 and 18, from Gibson Lake. Outgoing shipments of speckled trout eggs, besides those mentioned above, were in March 505,000 to Florenceville, 1,000,000 to Grand Falls and 250,000 to Middleton and of rainbow trout eggs in May 69,800 to Middleton. Distributions for the season amounted to 323,000 Atlantic salmon, 17,500 sebago salmon including 13,777 marked, 97,200 rainbow including 8,842 marked, and 4,379,500 speckled trout including 2,735 marked and the 4,154,000 eggs mentioned above. Marking was effected by removal of the adipose and one side fin.

In selective breeding 58 pairs of three year old speckled trout were used with an average yield of 3,314 eggs per female as against a yield of 2,708 in the general group of the same age.

The water was very low and warm during the summer making it necessary to supplement the supply obtainable from the reservoir by pumping water from the brook. Encouraging reports of improved fishing were received from all districts. Sixty-three of the best speckled trout early spawners were paired in the fall of 1943 and the eggs from each pair segregated until they were eyed. Segregation of the groups in which survival was highest was continued into the fry and fingerling stages. It was found that some of the groups with the lowest percentage losses to the eyed egg stage had the heaviest losses during the fry and fingerling stages but with other groups the reverse was the case.

It has been noted on two occasions that if a tray of trout eggs received a slight jar about the first or second time the eggs were picked that this would kill a few of them at the time but the remainder would continue to die until the time of hatching when the total loss might run to 90 or 95 per cent. That is, the detrimental effect of a jar to the eggs may not show up immediately but may continue and cause loss until the eggs are hatched.

Two eight inch wood pipes were laid to within 40 feet of the hatchery and the intakes extended into the reservoir to a point where they should supply cooler water during the summer and possibly slightly warmer water during the winter. The hatchery, dwelling and front of garage were painted, the outlet moved from the end to the centre of the large pond, the roof of the storage shed was coated with tar and sand, stripping shelter covered with canvas and the road and grounds improved generally.

The Moneton, Sussex, St. Stephen, Fredericton Junction, McAdam and Saint John branches of the Fish and Game Protective Association as well as interested citizens assisted in distributing hatchery fish in their respective districts.

Operations at Chamcook and Gibson Lakes were carried on with the assistance of the district supervisors of fish culture and under their general supervision. At Chamcook between October 24 and November 19 one hundred and eight sebago salmon averaging a little over 2 pounds each were taken, 35 females of which yielded 26,000 eggs. At Gibson between October 22 and November 16 seventy-five sebgos averaging one pound each were captured, 20 females of which produced 14,400 eggs. Eggs from both camps were transferred to Saint John hatchery for incubation. Of the 75 fish caught in Gibson Lake 36 or 48.0 per cent bore the hatchery markings.

## CARDIGAN REARING PONDS

*C. Sayer, Superintendent*

The ponds were in operation from May 8 to October 5 this season. From May 20 to 26 the hatchery at Southport supplied 100,000 Atlantic salmon, 92,200 rainbow and 193,900 speckled trout advanced fry. The output for the year was 69,600 Atlantic salmon, 87,500 rainbow and 134,500 speckled trout of which 1,565 of the last mentioned were marked by removal of the adipose and left pectoral fins and planted in Watts' stream, Winter River. Four new pond frames were made, a 30-foot flag pole erected, two ponds resodded, pond shades, refrigerator room and woodshed painted, some varnishing and painting done in the dwelling and grounds improved generally. Angling was reported to have been good.

## KELLY'S POND HATCHERY AND MORELL RIVER SALMON-RETAINING POND

*C. A. Tait, Superintendent*

A collection of 218,300 speckled trout eggs, more than twice the number taken last year at this place, was made from the hatchery pond and 65,300 from Simpson's pond at Hope River. Other eggs received were 300,000 speckled trout from Margaree March 16, 100,000 rainbow trout from Cape Cod Trout Company, Wareham, Mass., April 13 and 1,033,100 Atlantic salmon from Morell salmon pond November 9 to 25. Outgoing shipments on February 29 were 700,000 Atlantic salmon eggs to Saint John and 300,000 to Charlo hatchery; and in May, 193,900 speckled trout, 100,000 Atlantic salmon and 92,200 rainbow trout advanced fry to Cardigan rearing station. Distributions for the year were 242,800 salmon and 105,900 trout of which 1,595 of the latter were marked by removal of adipose and left pectoral fins. Six outside rearing tanks were made, portions of the hatchery interior painted, a hardwood floor laid in the dining room of the dwelling, two new sills placed under the garage and some grading done to the grounds.

Assistant C. H. Cooper was in charge of Morell pond where 247 salmon averaging 9.5 pounds in weight were impounded between October 13 and November 16; 1,033,100 eggs were obtained from 124 of these fish, November 9 to 25, and transferred to the Kelly's pond hatchery. Although the run of salmon was slightly smaller than last year, the average size and yield of the fish was larger. One of these fish bore tag number K.3601 which was attached at the pond in November, 1943. A second salmon, tag number 1279, celluloid, which was also attached in 1943, was recaptured on July 17, 1944, on the west side of Burnt Cape at the entrance of Pistolet Bay, Newfoundland. A new boat was built and the dam on Dunphy's brook, which is the source of the fresh water supply for washing and hardening the eggs, was repaired.



## DEPARTMENT OF FISHERIES

STATEMENT BY SPECIES OF LOCAL COLLECTION AND DISPOSAL OF EGGS DURING 1944

Species	Collection Area	Eggs collected	Number collected	Disposal—Establishment at	Eggs received	Number	Totals
Atlantic salmon.....	Margaree pond, N.S.....	Nov. 16-Dec. 6..	3,535,520	Lindloff.....	Nov. 21.....	1,061,180	.....
	River Philip, N.S.....	Nov. 8-22.....	7,131,000	Margaree.....	Nov. 17-Dec. 7..	2,474,340	.....
				Bedford.....	Nov. 9.....	1,040,200	.....
				Cobequid.....	Nov. 9-22.....	4,339,700	.....
Rainbow trout.....				Middleton.....	Nov. 14, 17.....	1,000,400	.....
				Yarmouth.....	Nov. 15.....	746,200	.....
				Dalhousie Univer- sity, Halifax, N.S.....			.....
				Bedford.....	Nov. 10.....	4,500	.....
Sebago salmon.....	Sackville River, N.S.....	Oct. 31-Nov. 9...	592,720	Florenceville.....	Oct. 31-Nov. 9...	592,720	.....
	Miramichi pond, N.B.....	Oct. 19-Nov. 8...	9,301,480	Grand Falls.....	Oct. 27.....	836,000	.....
				Miramichi.....	Oct. 27.....	937,200	.....
				Charlo.....	Oct. 20-Nov. 9...	7,528,280	.....
Speckled trout.....	New Mills pond, N.B.....	Oct. 25-Nov. 9...	1,805,620	Saint John.....	Oct. 26-Nov. 9...	1,805,620	.....
	Saint John hatchery ponds, N.B.....	Nov. 13.....	6,500	Kelly's Pond.....	Nov. 13.....	6,500	.....
	Morell River, P.E.I.....	Nov. 9-25.....	1,033,100	Saint John.....	Nov. 9-25.....	1,033,100	23,405,940
	Saint John hatchery ponds, N.B.....	Apr. 19-May 12..	109,100	Grand Lake.....	Apr. 19-May 12..	109,100	109,100
Speckled trout.....	Grand Lake, N.S.....	Oct. 30-Nov. 25..	58,140	Grand Lake.....	Oct. 30-Nov. 25..	58,140	.....
	Grand Lake rearing ponds, N.S.....	Nov. 3-28.....	87,560	Grand Lake.....	Nov. 3-28.....	87,560	.....
	Chamcook Lakes, N.B.....	Nov. 10-23.....	26,050	Saint John.....	Nov. 10-23.....	26,050	.....
	Gibson Lake, N.B.....	Nov. 11, 17.....	14,430	Saint John.....	Nov. 11, 18.....	14,430	186,180
Speckled trout.....	Antigonish hatchery ponds, N.S.....	Nov. 1-30.....	5,334,310	Antigonish.....	Nov. 1-Dec. 7..	10,944,560	.....
	Lindloff hatchery ponds, N.S.....	Nov. 9-Dec. 7..	(a) 5,610,250	Lindloff.....	Nov. 1-Dec. 7..	889,750	.....
	Melroe Lake, Richmond County, N.S.....	Oct. 17-Nov. 25..	447,810	Lindloff.....	Oct. 17-Nov. 25..	122,060	.....
	Margaree hatchery ponds, N.S.....	Oct. 31-Nov. 25..	(a) 441,940	Lindloff.....	Oct. 7-13.....	2,783,410	.....
Speckled trout.....		Oct. 7-13.....	122,060	Margaree.....	Oct. 20-Dec. 5..		.....
		Oct. 26-Dec. 5..	2,077,010				.....
		Nov. 15-Dec. 5..	(a) 706,400				.....
		Nov. 8-Dec. 6..	(a) 218,680				.....
Speckled trout.....	Yarmouth hatchery ponds, N.S.....	Nov. 21-Dec. 6..	68,120	Yarmouth.....	Nov. 8-Dec. 6..	286,800	.....
	Charlo hatchery ponds, N.B.....	Oct. 25-Nov. 23..	670,850	Charlo.....	Oct. 25-Nov. 23..	670,850	.....
	Florenceville hatchery ponds, N.B.....	Oct. 18-Nov. 14..	552,700	Florenceville.....	Oct. 18-Nov. 14..	552,700	.....
	Burnt Hill brook, Carleton Co., N.B.....	Oct. 12, 21.....	10,000	Florenceville.....	Oct. 12, 21.....	10,000	.....
Speckled trout.....	Saint John hatchery ponds, N.B.....	Nov. 5-20.....	5,980,020				.....
		Nov. 13-Dec. 11..	(a) 6,974,880	Florenceville.....	Nov. 7, 11.....	2,036,360	.....
				Middleton.....	Nov. 9.....	1,000,000	.....
				Saint John.....	Nov. 5-Dec. 11..	9,918,540	.....
Speckled trout.....	Trout brook, Charlotte County, N.B.....	Oct. 9-Nov. 22...	119,880	Saint John.....	Oct. 9-Nov. 22...	119,880	.....
	Southport (Kelly's Pond) hatchery pond, P.E.I.....	Nov. 6-Dec. 23..	218,270	Kelly's Pond.....	Nov. 6-Dec. 23..	218,270	29,553,180
							53,254,400

(a) eggs from yearling fish.



The receipt of 150,000 rainbow trout eggs (autumn spawning strain) from the Fish and Wildlife Service, Washington, D.C.; the same number of the similar eggs (Paul lake, Kamloops strain) from the British Columbia Game Commission and 10,000 brown trout from the Ontario Department of Game and Fisheries are gratefully acknowledged. Return shipments comprised, respectively, 50,000 and 120,000 Atlantic salmon eggs to the Fish and Wildlife Service and 120,000 to the Ontario Department. Four hundred and four thousand rainbow trout eggs were purchased from the Cape Cod Trout Co., Wareham, Mass., and 65,300 speckled trout eggs from Nelson Simpson, Bay View Mills, P.E.I.

In the interest of economy and convenience in distribution the following transfers were made in 1944:—

Species	Stage	From	To	Number	Date received
Atlantic salmon...	(c)	(a) Bedford.....	Yarmouth.....	300,000	March 21
	(d)	(a) Bedford.....	Grand Lake.....	414,000	May 28-June 20
	(e)	(a) Bedford.....	Grand Lake.....	125,040	June 27, 29, Sept. 12
	(d)	(a) Bedford.....	Mersey.....	308,000	May 31-June 16
	(c)	(a) Cobequid.....	Antigonish.....	1,001,000	March 25
	(c)	(a) Cobequid.....	Middleton.....	400,400	April 4
	(c)	(a) Cobequid.....	Saint John.....	76,800	April 14
	(e)	(a) Middleton.....	Kejimikujik.....	295,000	May 30-June 13
	(c)	(a) Middleton.....	Coldbrook.....	100,000	May 31, June 1
	(c)	(a) Miramichi.....	Florenceville.....	600,000	March 25
	(c)	(a) Miramichi.....	Grand Falls.....	800,000	March 18
	(c)	(a) Kelly's Pond...	Charlo.....	300,000	March 2
	(c)	(a) Kelly's Pond...	Saint John.....	700,000	March 1
	(d)	(a) Kelly's Pond...	Cardigan.....	100,000	May 20
Rainbow trout....	(d)	(a) Middleton.....	Coldbrook.....	37,500	May 18, 19
	(d)	(b) Middleton.....	Coldbrook.....	84,000	May 25, 26
	(e)	(b) Middleton.....	Coldbrook.....	35,700	July 3, 4
	(c)	(b) Saint John.....	Middleton.....	69,800	May 23, 25
	(d)	(b) Kelly's Pond...	Cardigan.....	92,200	May 25, 26
Speckled trout....	(e)	(a) Antigonish.....	Grand Lake.....	35,000	Oct. 12-19
	(c)	(a) Lindloff.....	Cobequid.....	269,480	March 10
	(c)	(a) Margaree.....	Antigonish.....	5,000	February 14
	(c)	(a) Margaree.....	Cobequid.....	165,000	February 25, Mar. 15
	(c)	(a) Margaree.....	Lindloff.....	5,000	February 14
	(c)	(a) Margaree.....	Florenceville.....	5,000	February 26
	(c)	(a) Margaree.....	Saint John.....	5,000	February 25
	(e)	(a) Margaree.....	Kelly's Pond.....	300,000	March 16
	(e)	(a) Yarmouth.....	Kejimikujik.....	15,580	May 29
	(c)	(a) Yarmouth.....	Mersey.....	11,000	May 26
	(c)	(a) Charlo.....	Miramichi.....	100,000	April 25
	(c)	(a) Saint John.....	Florenceville.....	505,000	March 4
	(c)	(a) Saint John.....	Grand Falls.....	1,000,000	March 8, 30
	(c)	(a) Saint John.....	Middleton.....	250,000	March 29
	(d)	(a) Kelly's Pond...	Cardigan.....	193,900	May 22-24

(a) 1943 fall collection, (b) 1944 collection, (c) eyed eggs, (d) fry, (e) fingerlings.

## EGGS, FRY, FINGERLINGS AND OLDER FISH ON HAND END OF CALENDAR YEAR 1944

Establishment	Species	Eggs	Fry	Fingerlings	1 year	2 year	3 year	4 year	5 year and older	Total by specie	Total by hatchery
Antigonish.....	Atlantic salmon. Speckled trout.....	10,324,020	.....	9,800	8,992	<sup>9</sup> 2,100	.....	.....	.....	10,344,912	10,344,921
Bedford.....	Atlantic salmon.....	1,380,490	.....	.....	.....	.....	.....	.....	.....	1,380,490	1,380,490
Cobequid.....	Atlantic salmon.....	4,290,150	.....	.....	.....	.....	.....	.....	.....	4,290,150	4,290,150
Grand Lake.....	Atlantic salmon. Sebago salmon. Speckled trout.....	91,950	.....	61,756 27,151 34,880	4,692	3,327	271	17	38	61,756 127,446 34,886	224,088
Lindloff.....	Atlantic salmon. Speckled trout.....	1,056,680 642,030	80,000	17,793	1,320	.....	.....	.....	.....	1,056,680 741,143	1,797,823
Margaree.....	Atlantic salmon. Speckled trout.....	2,432,990 2,008,900	.....	16,917	8,404	2,790	.....	.....	.....	2,432,990 2,037,161	4,470,151
Middleton.....	Atlantic salmon. Speckled trout.....	977,100 575,900	.....	.....	.....	.....	.....	.....	.....	977,100 575,900	1,553,000
Yarmouth.....	Atlantic salmon. Speckled trout.....	720,160 147,130	.....	.....	548	581	196	20	.....	720,160 150,832	870,992
Charlo.....	Atlantic salmon. Speckled trout.....	1,712,390 589,850	.....	2,357 2,688	.....	.....	582	257	.....	1,712,390 583,377	2,305,767
Florenceville.....	Atlantic salmon. Sebago salmon. Speckled trout.....	804,410	.....	41,455	.....	.....	.....	54	.....	845,865 54	3,209,397
Grand Falls.....	Atlantic salmon.....	2,319,000	.....	33,920	9,250	629	596	83	.....	2,363,478	919,250
Miramichi.....	Atlantic salmon.....	919,250	.....	.....	.....	.....	.....	.....	.....	919,250	7,363,640
Saint John.....	Atlantic salmon. Rainbow trout. Sebago salmon. Speckled trout.....	7,363,640 5,650 39,640 5,183,070	.....	20 1,733 3,922 40,881	.....	.....	53	30	8	5,700 1,794 47,225 5,249,472	5,304,191
Kelly's Pond.....	Atlantic salmon. Speckled trout.....	980,230 253,210	.....	.....	.....	.....	.....	.....	.....	980,230 253,210	1,233,440
		44,817,900	80,000	295,279	60,186	11,730	1,698	461	46	45,267,300	45,267,300

## DISTRIBUTIONS

## KEY TO ABBREVIATIONS

<i>Species</i>
A. Atlantic salmon.
B. Brown trout.
K. Kamloops trout.
R. Rainbow trout.
L. Landlocked or Sebago salmon.
S. Speckled trout.

<i>Stages of Development</i>
a. Green eggs.
b. Eyed eggs.
c. Fry.
d. Advanced fry.
1. No. 1 Fingerlings.
2. No. 2 Fingerlings.
3. No. 3 Fingerlings.
4. No. 4 Fingerlings.
5. No. 5 Fingerlings.
f. Yearlings.
g. Two years.
h. Three years.
k. Older fish.

## CLASSIFICATION

Advanced fry: Fry that are feeding systematically.

## Fingerlings:

- No. 1. Feeding from two to eight weeks.
- No. 2. Feeding from eight to fourteen weeks.
- No. 3. Feeding from fourteen to twenty weeks.
- No. 4. Feeding from twenty to twenty-six weeks.
- No. 5. Feeding from twenty-six weeks to one year from date of hatch.

## NOVA SCOTIA

## ANTIGONISH HATCHERY

*Antigonish County—*

Afton River—20,000 S1.  
 Beaver Meadow River—30,000 Sd, 7,635 S3.  
 Big brook—South River—30,000 Sd, 2,000 S3.  
 Black River—20,000 S1, 2,000 S4.  
 Brierly brook—20,000 S1.  
 Cameron Lake (Loch Katrine)—600 Sf.  
 Copper Lake—2,600 S2, 520 S4.  
 Delhanty Lake—10,000 S1.  
 Gaspereaux Lake—5,000 S3, 500 Sf.  
 Glenroy River—20,000 S1, 2,500 S3, 2,000 S4.  
 James River—50,000 Ad, 20,000 A1, 15,000 A3.  
 MacDonald Lake—600 Sg.  
 MacGillivray Lake—South River—550 Sg.  
 Maryvale or Malignant brook—20,000 S1.  
 McMillan Lake—700 Sf.  
 Meadow Green River—30,000 S1, 3,000 S3, 2,000 S4.  
 Middleton Lake—35,000 S1.  
 North Lake—35,000 S1.  
 North River—5,000 S1.  
 Pinevale brook—10,000 Sd.  
 Pinevale Lake—10,000 Sd.  
 Polson brook—South River—20,000 Sd, 2,000 S3.  
 Rights River—50,000 Ad, 10,000 A1.  
 St. Joseph Lake—1,765 S3, 735 S4, 700 Sg.  
 South River—15,000 A3, 4,000 S3, 3,490 S4, 1,700 Sf.  
 South River Lake—50,000 Sd, 700 Sg.  
 South Lake—40,000 S1.  
 Springfield brook—Glenroy River—20,000 S1, 2,000 S3, 1,000 S4.

West River—60,000 Sd, 20,000 S3, 3,000 S4, 1,300 Sf.

*Cumberland County—*

Sutherland Lake—13,000 S3, 2,500 S4.

*Guysborough County—*

Big Brook Lake—1,500 S3.  
 Canter Lake—30,000 S1.  
 Cocee Coffre Lake—40,000 S1.  
 Country Harbour River—50,000 Ad.  
 Cudahys Lake—15,000 S1.  
 Dobson Lake—70,000 S1, 500 Sf.  
 Donahue Lake—50,000 S1, 12,000 S2, 500 Sf.  
 Doyle Lake—10,000 S1.  
 Ecumsecum River—40,000 S1.  
 Fitzgerald Lake—15,000 S1.  
 Giant Lake—50,000 S1, 10,000 S3, 3,000 S4.  
 Goldboro or Goldbrook Lake—30,000 S1.  
 Goshen Lake—10,000 S2, 700 Sf, 700 Sg.  
 Guysborough River—15,000 S1.  
 Hazel Hill Lake—50,000 S1.  
 Hydro dam, Havre Bouche River—50,000 S1.  
 Indian Harbour Lake—30,000 S1.  
 Jellow Lake—60,000 S1, 5,000 S2, 600 Sf.  
 Kennedy Lake—20,000 S1, 2,500 S3.  
 Mannassette Lake—40,000 S1.  
 McInnis (Joe's) Lake—20,000 S1, 2,500 S3.  
 McPherson Lake (Port Shoreham)—50,000 S1.  
 Morrison Lake—15,000 S2.  
 Narrow Lake—35,000 S1, 3,000 S3.  
 Porter River—35,000 S1.  
 Pringle Lake—500 Sg, 1,262 Sh.

*Guyborough County—Con.*

East River St. Mary—100,000 Ad, 50,000 A1, 20,000 A2, 15,000 A3.  
 West River St. Mary—100,000 Ad, 100,000 A1, 20,000 A2, 17,700 A3.  
 Salmon River—50,000 Ad, 30,000 S1.  
 Seal Harbour Lake—20,000 S1.  
 Sherbrook Lake—50,000 S1, 600 Sf.  
 Sullivan Lake—30,000 S1, 2,500 S3.  
 Taylor Lake—East River St. Mary—10,000 S2.  
 Three Mile Lake—30,000 S1.  
 Tracadie River—15,000 A2.  
 Two-mile Lake—East River St. Mary—15,000 S2, 700 Sf.

*Pictou County—*

Barney River—35,000 Ad, 20,000 A1, 5,000 A3, 20,000 S1.  
 Big brook—East River—10,000 S2.

Blue Mountain dam, French River—4,600 S2.  
 Brora Lake—13,000 S2.  
 Calder Lake—20,000 S2.  
 Campbell Lake—French River—15,000 S2.  
 East River—80,000 A1, 40,000 S1.  
 French River—30,000 A1.  
 French River branch (French River Settlement)—10,000 S1.  
 Grant Lake—East River—5,200 S3, 1,040 S4.  
 Lansdowne Lake—10,000 S2.  
 Little Caribou River—5,000 S3.  
 McLellan brook—15,000 S1.  
 McPherson Lake—15,000 S2.  
 Middle River—30,000 A1.  
 Sixmile brook—20,000 S1.  
 Sutherland River—15,000 S1.  
 Taylor Lake—East River—7,500 S3.  
 West Branch brook—East River—20,000 S1, 500 Sf.  
 West River—40,000 S1.

## BEDFORD HATCHERY

*Halifax County—*

Kearney Lake—2,980 S1.  
 Little Sackville River—16,270 A1.  
 Little Salmon River—Cole Harbour—71,890 Ad.  
 Round Pond (Smith Settlement)—6,460 B2.

## COBEQUID HATCHERY

*Colchester County*

Economy Lake—4,000 S1.  
 Gamble Lake—2,500 S2.  
 Newton Lake—4,000 S1.  
 Simpson Lake—10,000 Sd.  
 Snare Lake—3,500 S1.  
 West Branch Lake—River Philip—2,050 S2, 350 S3.

*Cumberland County—*

Amherst pond (Reservoir) and tributaries  
 Nappan River—3,500 S2.  
 Atkinson brook—River Herbert—2,500 S1.  
 Cumberland Railway Reservoir (Springhill)—Maccan River—2,000 S1.  
 Doherty brook—1,250 S3.

Gilbert Lake—1,500 S2.  
 Isaac Lake—2,000 S1.  
 Newfound Lake—2,500 S1.  
 Otter Lake—Portapique River—1,500 S1.  
 Parrsboro Aboiteau—2,500 S2.  
 Poison Lake—2,000 Sd.  
 River Philip—15,750 A1.  
 Shulie River—4,000 S1.  
 Smith's pond—Polly brook—2,000 S1.  
 Wallace River—12,000 Sd.

*Westmorland County—*

North brook—Musquash Lake—4,750 S1.  
 Robinson brook—Tantramar River—5,500 S1.

## COLD BROOK PONDS

*Annapolis County—*

Ramsey (Rumsey) Lake—25,000 R3.

*Kings County—*

Gaspereau River—66,080 A1, 3,110 A4.  
 Sunken Lake—56,674 R3.

*Lunenburg County—*

Forty creek—Sherbrooke Lake—12,000 R3.  
 Francy or Butler brook—Sherbrooke Lake—13,400 R3.  
 Gold River—22,000 A1.  
 Gully River—Sherbrooke Lake—13,000 R3.  
 Sherbrooke River—23,228 R3, 3,523 R4.

## GRAND LAKE PONDS

*Colchester County—*

Stewiacke River—20,000 A3, 4,400 Af.

*Halifax County—*

Beaverbank River—1,074 Af, 1,074 Lf.

Black Point Lake—2,000 Sf.  
 Chezzetcook River—20,000 A3.  
 Eagle Lake—Partridge River—2,000 Sf.  
 Five Island Lake—3,000 Sf.  
 Goose Lake—Porter Lake—2,000 Sf.



*Halifax County—Con.*

Hatchet Lake—1,000 Sf.  
 Heffler Lake—1,200 Sf.  
 Henry Lake—1,000 Sf.  
 Ingram River—20,000 A3, 8,000 Af.  
 Kieley Lake—1,000 Sf.  
 Long Lake-Little Salmon River—2,000 Sf.  
 Little Salmon River-Cole Harbour—20,000 A3.  
 McGrath Lake—1,000 Sf.  
 Miller Lake—1,070 Sf.  
 Moody Lake—2,000 Sf.  
 Moose Lake—1,000 Sf.  
 Musquodoboit River—30,000 A3, 5,000 Af.  
 Ninemile River—20,000 A3, 8,000 Af.  
 Pace Lake—3,500 Sf.  
 Perry Lake—1,000 Sf.  
 Pockwock Lake—2,000 Sf.  
 Rawdon River—20,000 A4, 10,695 Af, 3,695 Lf.  
 Sackville River—20,000 A4, 5,000 Af.  
 Salmon River—Echo Lake—20,000 A3, 5,000 Af.

Salmon River (Port Dufferin)—15,000 A3.  
 Sluice Lake—1,000 Sf.  
 Ship Harbour River—20,000 A3.  
 Shubenacadie (Grand) Lake—482 Lh, 65 Lk.  
 Tangier River—15,000 A4.  
 Upper Petpeswick, Long Bridge or Bridge End Lake—4,000 Sf.  
 West River Sheet Harbour—15,000 A4.  
 Weaver Lakes—1,000 Sf.  
 Williams Lake (North West Arm)—2,000 Sf.

*Hants County—*

Cameron Lake—1,000 Sf.  
 Kennetcook River—30,000 A3, 4,000 Af.  
 Lewis Lake—1,000 Sf.  
 Walton River—1,000 Sf.

*Lunenburg County—*

East River—20,000 A3, 8,000 Af.  
 Gold River—20,000 A3.  
 Middle River—20,000 A3.  
 Spondo Lake—2,000 Sf.

## KEJIMKUJIK PONDS

Lahave River—52,200 A3.  
 Medway River and tributaries—150,710 A3.

Mersey River—  
 Grafton brook—330 S2.  
 Kejimikujik Lake—1,094 S3.

## LINDLOFF HATCHERY

*Cape Breton County—*

Belfry Lake—5,000 S1, 10,000 S2.  
 Canoe Lake—4,000 S1.  
 Catalogne Lake—8,000 S3.  
 Chain or String Lakes—Mira River—5,000 S1.  
 Cochran Lake—10,000 S2.  
 Dutch Brook Lake—5,000 S1, 606 S5.  
 Gabarus Lake—5,000 S1, 6,060 S2.  
 Gaspereaux River—50,000 A2, 36,000 A4.  
 Gillies Lake-East Bay—10,000 S2, 500 Sf.  
 Grand Lake, near Louisburg—8,000 S3.  
 Hardy Lake—5,000 S1.  
 Loon Lake-Mira Bay—10,000 S2.  
 McCormick Lake—9,000 S2.  
 Meadow Brook-Sydney River—9,000 S1.  
 Mullcuish Lake—5,000 S1, 10,000 S2.  
 Salmon River—180,000 A2, 19,000 A4.  
 Stewart Lake—8,000 S3.

*Inverness County—*

Brawley Lake—5,000 S2.  
 Horton Lake—5,000 S2.  
 McIntyre Lake (Grantville)—5,000 S2.  
 Pleasant Hill Lake—5,000 S2.

*Richmond County—*

Black River—10,000 S1.  
 Breen Lake—5,000 S2.

Falls Bay brook—3,000 S1.  
 Ferguson Lake—15,000 S2.  
 Ferguson brook—5,000 S1.  
 Framboise River—120,000 A2.  
 Grand River—140,000 A2.  
 Indian Lake—5,000 S1.  
 Kytes Lake—291 Sh.  
 Loch Lomond—220,000 A2, 18,000 A4.  
 MacLeod brook—5,000 S1.  
 Mary Ann's Lake—5,000 S1.  
 McIsaac Lake—5,000 S2.  
 McKenzie Lake—5,000 S2, 3430 S3.  
 McNab Lake—10,000 S2.  
 Mill Lake-East River Tillard—5,000 S2.  
 River Tillard, West—10,000 S1.  
 River Tillard, East—5,000 S1.  
 River Tom—10,000 S1.  
 Saint Esprit Lake—7,000 S1.  
 Straughton brook—5,000 S1.  
 Thompson Lake—5,000 S1.  
 Madame Island—  
 Babins Lake—5,000 S1.  
 Chain Lake—12,000 S2.  
 Forest Lake—5,000 S1.  
 Grand Lake—5,000 S1, 15,000 S2.  
 Latimore Lake—4,000 S2.  
 Noels Lake—5,000 S1.  
 Potties Lake—12,000 S2.  
 Shaw Lake—2,500 S1, 12,000 S2.

## MARGAREE HATCHERY

*Cape Breton County—*

Belle Lake—10,000 S2.  
 Black brook-Mira River—10,000 S3, 5,000 S4.  
 Ferguson Lake (New Boston)—5,000 S2.

Forester Lake—15,000 S3.  
 Giovonetti Lake—10,000 S2, 5,000 S4.  
 Grand Lake-Indian Bay—10,000 S3.  
 Jackson or Johnson Lake—10,000 S3, 1,000 Sf.

*Cape Breton County—Con.*

Kilkenny Lake—15,000 S5, 1,000 Sf.  
 McDonald or Widow Lake (New Boston)—10,000 S3.  
 McInnes Lake—10,000 S1.  
 McIntyre Lake (New Boston)—10,000 S2, 5,000 S4.  
 McMillan Lake—10,000 S3.  
 McPherson Lake (New Boston)—10,000 S3.  
 Scotch or Scott Lake—15,000 S4.  
 Trout brook-Mira River—10,000 S1, 5,000 S4.

*Inverness County—*

Big brook-River Denys—20,000 S1.  
 Broad Cove River or Strathlorne brook—500 Sg.  
 Cheticamp River—50,000 Ac, 100,000 A1, 100,000 A2.  
 Farm brook—10,000 S3.  
 Galant River—25,000 S1, 250 Sf.  
 Glen brook-River Denys—10,000 S1, 300 Sf.  
 Glenora brook—10,000 S1, 2,900 S5.  
 Grand Etang brook—10,000 S1.  
 Margaree River, northeast and tributaries—90,000 Ac, 240,000 Ad, 50,000 A1, 50,000 A2, 460,000 A3.  
 Egypt brook—20,000 S1, 500 Sg.  
 Forest Glen brook—50,000 S1.  
 Ingram (Ingraham) brook—400 Sg.  
 Lake O'Law brook—3,000 S4.  
 Lake O'Law—10,000 S3, 2,000 S5.  
 Levis brook—25,000 S1.  
 Watson brook—10,000 S1.  
 Margaree River, southwest—50,000 Ac, 100,000 Ad, 150,000 A1, 60,000 A2.  
 Captain Allan's brook—30,000 S1.  
 Matheson Glen brook—25,000 S1.  
 McDonnell brook—10,000 S1.  
 McLellan ponds, 2,000 S1.  
 McColl brook—20,000 S2.

McKenzie brook-River Denys—25,000 S2, 244 Sf.  
 McPherson brook-River Denys—20,000 S2.  
 Mull River—50,000 Ac, 50,000 A1.  
 Plaster ponds—644 Sg, 1,557 Sh.  
 Plateau brook—30,000 S1, 250 Sf.  
 Rough brook-River Inhabitants—20,000 S2, 300 Sf.  
 Skye brook—20,000 S1, 250 Sf.  
 Smith's ponds—Glendyer brook—500 S3.

*Victoria County—*

Aspy River, north—50,000 A2.  
 Aspy River, middle—50,000 A3.  
 Baddeck reservoir—375 Sf.  
 Baddeck River—50,000 Ac, 50,000 A1.  
 Farquar Angus or McDonald brook—500 Sf.  
 Gillis brook—30,000 S2.  
 Harris Brook—375 Sf.  
 Peter brook—30,000 S2.  
 Barasois brook—40,000 S1.  
 Campbell brook (Estmere)—10,000 S4.  
 Carey Lake—4,500 S3.  
 Dalem Lake (Boularderie Island)—10,000 S4.  
 Giffin Lake—7,500 S3.  
 Ingonish River—30,000 A3.  
 McKinnon Harbour brook—10,000 S4.  
 McLean brook (Ottawa brook)—5,000 S4.  
 McPhie brook (Southside Boularderie)—5,000 S4.  
 Middle River—50,000 Ac, 50,000 A1.  
 Black brook—25,000 S4.  
 Cold brook—20,000 S3, 750 Sf.  
 Indian brook—15,000 S5.  
 McDonald brook—25,000 S2.  
 Morrison Lake—7,500 S3.  
 North River—50,000 Ad, 100,000 A1, 50,000 A2.  
 Church brook—10,000 S3.  
 Tarbot Lake—5,000 S3.  
 Washabuck River—25,000 S2, 5,000 S4.

## MERSEY PONDS

Feeuer Lake—1,720 S4.  
 Fort Point Lily pond—1,500 S4.

Mersey River and tributaries—168,700 A3.  
 Lower Great brook—1,000 S4.  
 Upper Great brook—1,000 S4.

## MIDDLETON HATCHERY

*Annapolis County—*

Annapolis River—40,000 A3.  
 Lequille River—25,000 A3.  
 Nictaux River—115,000 A3, 50,000 A4.  
 Ramsey (Rumsey) Lake—33,067 R3.  
 Round Hill River—25,000 A3.

*Hants County—*

Avon River—25,000 A3.  
 Panuke Lake—40,000 A3.

*Lunenburg County—*

Gold River—45,000 A3.  
 Lahave River—50,000 A3.  
 Petite River—25,000 A3.  
 Sherbrooke River and tributaries—8,000 K1, 7,500 K2, 25,000 R3, 5,154 R4.

## YARMOUTH HATCHERY

*Digby County—*

Briar Lake—36,580 Sd.  
 Carleton River—35,000 A3, 12,500 A4, 2,710 A5.  
 Salmon River—50,000 A1, 15,000 A4.

*Shelburne County—*

Clyde River—25,000 A3, 39,000 A4.  
 Jordon River—27,500 A4, 17,000 A5.  
 Roseway River—25,000 A3, 35,500 A4.

*Yarmouth County—*

Carleton River and tributaries—50,000 A1,  
47,000 A2.

Crawley Lake—257 Sh, 15 Sk.

Rushy Lake—1,407 Sf.

Trefry Lake—36,580 Sd.

Tusket River, east branch—8,000 A2.

## NEW BRUNSWICK

## CHARLO HATCHERY

Black Lake—Walker brook—2,600 S2, 520  
S3.

Christopher brook—1,000 S2.

Eel River—500 S3.

Hariman Lake—25,000 S1.

Henry's Lake—Charlo River—2,400 S3.

Jacquet River—50,595 A2.

Juniper Lake—1,000 S3.

Loch Lomond—2,600 S2, 520 S3.

Nash creek—300 S3.

Nipisiguit River—167,000 A2.

Restigouche River—297,275 A2, 47,500 A3.

Kedgwick River—37,950 A1, 24,150 A2.

Matapedia River—75,900 A1, 62,100 A2.

Upsalquitch River—37,950 A1, 158,700  
A2.

Walker brook—500 S2.

## FLORENCEVILLE HATCHERY

*Carleton County—*

Acker brook—Saint John River—400 Sf.

Ash brook—Fewer Lake—400 Sf.

Becaguimec River—130,000 A1.

Bennett Lake—400 Sf.

Bubar brook—Saint John River—10,000 S1.

Bull creek—Eel River—10,000 S1, 400 Sf.

Bulls creek—Saint John River—10,000 S1,  
500 Sf.

Burnt Land brook—Becaguimec River—  
10,000 S1, 400 Sf.

Burpee brook—Presquile River—400 Sf.

Cold stream—Becaguimec River—1,000 Sf.

Day brook—Becaguimec River—10,000 S1.

Debec brook—Sherwood Lake—400 Sf.

Dingee brook—Presquile River—3,000 S1.

Gallivan brook—Little Presquile River—  
5,000 S1.

Gibson's Mill brook—Saint John River—800  
Sf.

Gin brook—Becaguimec River—5,000 S1.

Glassville Beaver pond—Cold stream—400  
Sf.

Guisiguit River—5,000 S1, 400 Sf, 160 Sh.

Hagerman brook—Meduxnekeag River—  
400 Sf.

Hatfield brook—Saint John River—10,000  
S1.

Johnville Beaver pond—Shiktahawk River—  
600 Sf.

Little Guisiguit River—5,000 S1, 400 Sf,  
160 Sh.

Little Presquile River—1,000 Sf.

Little Shiktahawk River—25,000 A1.

McLeary brook—Lakeville pond—5,000 S1.

Meduxnekeag River—150,000 A1.

Miramichi River, southwest and tribu-  
taries—280,000 A1, 25,000 A2, 24,982  
Af.

Monquart River—125,000 A1.

Presquile River—150,000 A1.

River des Chutes—600 Sf.

Saint John River—35,000 A1, 29,520 S1,  
227 Sk.

Second or Upper Howard brook—Becagui-  
mec River—10,000 S1.

Shiktahawk River—100,000 A1.

*Sunbury County—*

Burpee brook—French Lake—600 Sf.

*York County—*

Brown Lake—500 Sf.

Cranberry or Harvey Lake—1,000 Sf.

Davidson Lake—400 Sf.

Dead creek—Eel River—10,000 S1, 600 Sf.

Frog Lake—400 Sf.

George Lake—560 Sf.

Green Hill Lake—Keswick River—300 Sf.

Joslin or Waterloo Lake—400 Sf.

Keswick River—85,000 A1.

Longs creek—Saint John River—10,000 S1,  
600 Sf.

Mactaquac River—70,000 A1.

Nackawic River—100,000 A1.

Nashwaak River—40,000 A1, 55,000 A2,  
40,000 A3.

Nashwaakis River—600 Sf.

Penniac brook—Nashwaak River—600 Sf.

Pokiok River—10,000 S1, 560 Sf.

Risteen brook—Eel River—3,000 S1, 400 Sf.

Shogomoc River—10,000 S1, 700 Sf.

Skiff Lake—30,000 A1.

Tay River—800 Sf.

## GRAND FALLS HATCHERY

*Victoria County—*

Saint John River and tributaries—200,000

Ad, 265,000 A1, 335,000 A2, 124,440  
A3.

Little River—26,490 S1.

Salmon River and tributaries—175,000  
Ad, 400,000 A1, 160,000 A2, 72,000  
A3.

Sutherland brook—20,000 Sc, 25,000 S1.

Tobique River and tributaries—25,000  
Ad, 25,000 A1, 160,000 A2.

## MIRAMICHI HATCHERY

Bartibog River—7,000 S1.  
 Black River—1,100 S2.  
 Grand Aldouane River—5,600 S2.  
 Miramichi River, northwest and tributaries—1,086,000 Ad, 78,890 A2.  
 Miramichi River, southwest and tributaries—816,000 Ad, 320,000 A1, 19,200 A2.

Miramichi River, little southwest—540,000 Ad, 360,000 A1.  
 Napan River—5,000 S1.  
 Pokemouche River—5,600 S2.  
 Pollett River—20,000 A2.  
 Tabusintac River—96,000 Ad.  
 Eskedellie River—8,000 S1.

## SAINT JOHN HATCHERY

*Albert County—*

Petitcodiac River—4,000 A1.  
 Silver Moon Lake—1,000 S2.  
 Stannard Lake—4,000 Sc.  
 Turtle creek—1,200 Sf.

*Charlotte County—*

Bartlett Lake—1,430 S2.  
 Chamcook Lake—3,700 L2, 13,205 Lf, 572 Lg.  
 Clarence brook-Digdeguash Lake—4,277 S2.  
 Clear brook-McDougall Lake—3,575 S2.  
 Cox brook-Magaguadavic River—1,430 S2.  
 Crecy Lake—675 Sf.  
 Digdeguash River—20,278 S2, 1,200 Sf.  
 Digdeguash River, N.W.—3,575 S2.  
 Goat brook-Canoose River—1,430 S2.  
 McCarlies brook-Waweig River—2,860 S2.  
 Murchie brook-Denny stream—715 S2.  
 New River—3,000 S2.  
 St. Patrick Lake—1,060 Sf.  
 Sandy brook-Canoose River—1,430 S2.  
 Spear's brook-Trout Lake—3,000 S2.

*Kent County—*

Buctouche River—3,800 S2.  
 Coal Branch River—5,240 S2.  
 Cocagne River—3,800 S2.  
 Cocagne River, northwest branch—1,000 Sf.  
 Kouchibouguac River—1,520 S2.  
 Mahalawodiac River or McKee Mills stream—1,520 S2.  
 St. Nicholas River—3,040 S2.  
 Salmon River—3,040 S2.

*Kings County—*

Bacon or Island Lake—4,000 Sc.  
 Big Salmon River—19,250 R3.  
 Crow brook—9,250 R3, 6,242 R5.  
 Dick's Lake—8,000 R3, 9,468 R5.  
 Hammond River—5,000 S2.  
 Island Lake (Oak Pt.)—6,000 Sc.  
 Kennebecasis watershed—150,000 A1.  
 Chestnut brook—3,000 S2.  
 McGregor brook—3,000 S2.  
 McLeod brook—4,200 S2.  
 Oldfield brook—2,700 S2.  
 Portage brook—4,000 S2.  
 Salmon River—4,000 S2.  
 Sanction brook—1,000 S2.  
 Smith creek—3,000 S2.

Studholm brook or Millstream—4,000 S2.  
 Ward creek—4,200 S2.  
 Ox Shoe Lake—1,000 S1.  
 Terreo Lake—1,000 Sf.  
 Whittaker Lake—4,000 Sc.

*Queens County—*

Fish Lake-Saint John River—4,000 Sc.  
 Mud Lake-Nerepis River—2,400 S2.  
 Salmon River—110,000 A1.

*Saint John County—*

Beaver Lake—4,000 Sc.  
 Blindman Lake—705 Sf, 600 Sh.  
 Boaz Lake—1,000 S2.  
 Dead brook-Loch Lomond—8,000 S2.  
 Dolan Lake—647 Sh.  
 Douglas Lake—1,100 Sf.  
 Germaine brook—5,000 S2.  
 Hanford brook—3,000 S2.  
 Henry Lake—5,000 S2.  
 Howe Lake—1,000 S2.  
 Lily Lake-Rockwood Park—350 Sf, 279 Sg and Sh.  
 Limestone Lake (Brookville)—4,000 Sc, 1,000 S1.  
 Little River—45,000 R2, 3 Rh, 298 Sf, 159 Sg, 409 Sh.  
 Mispek River—1,830 S1.  
 Nelson Lake—500 Sf.  
 Second Lake-Loch Lomond—5,000 S2.  
 Third Lake-Loch Lomond—5,000 S2.  
 Treadwell Lake—400 Sf.  
 Tynemouth or Ten Mile creek—50,000 A1.

*Sunbury County—*

Mersereau brook - Oromocto River—12,000 S2.  
 Oromocto Lake—7,000 S2.  
 Oromocto River—1,000 Sf.  
 Oromocto River, northwest—9,040 A5.  
 Three Tree creek-Oromocto River—12,000 S2.

*Westmorland County—*

Hall creek-Petitcodiac River—200 Sf.  
 Prices brook-Canaan River—1,520 S2.  
 Tait brook-Memramcook River—1,520 S2.

*York County—*

Cranberry or Harvey Lake—1,400 Sf.



## PRINCE EDWARD ISLAND

## CARDIGAN PONDS

*Kings County—*

Bear River—3,000 S3.  
 Big brook-Fortune River—3,500 S3.  
 Big pond (Hermanville)—5,000 S3.  
 Brudenell River—3,000 S3.  
 Buell's brook—Murray River—2,400 S3.  
 Cardigan River—3,425 S3.  
 Crane's pond—Morell River—3,000 S3.  
 Creed's pond-Sturgeon River—3,500 S3.  
 Finlayson's pond-Greek River—4,000 S3.  
 Fox River—1,200 S3.  
 Hay River—3,000 S3.  
 Jenkin's pond-Greek River—1,200 S3.  
 Leard's pond-Morell River—3,000 S3.  
 McKinnon stream-Morell River—4,000 S3.  
 McLeod's pond-Midgell River—3,000 S3.  
 Montague pond (Electric Power)—4,000 S3.  
 Mooney's pond-Morell River—2,400 S3.  
 Morell River—69,650 A3.  
 Munn's brook-Brudenell River—1,500 S3.  
 Poole's pond-Montague River—1,200 S3.  
 Priest pond (Bayfield)—3,000 S3.  
 Sturgeon River—1,800 S3.  
 Webster's pond-Marie River—3,000 S3.

*Prince County—*

Cain's stream-Mill River—3,000 S3.  
 Dunk River—4,500 S3.  
 Gard's pond-Mill River—3,000 S3.  
 McWilliam's pond-Pierre Jacques River—3,000 S3.

Myrick's pond-Little Tignish River—1,500 S3.  
 Old Woollen Mills pond-Tryon River—2,400 S3.  
 St. Nicholas pond-Sunbury Cove—3,000 S3.  
 Sheen's pond-Trout River (Tyne Valley)—1,800 S3.  
 Sheep River—2,400 S3.  
 Tignish River—3,000 S3.  
 Tuplin's pond-Indian River—1,800 S3.  
 Wright Leard's pond-Dunk River—3,000 S3.

*Queens County—*

Ballam's stream-Pownall Bay—1,200 S3.  
 Beer's pond-Clyde River—3,000 S3.  
 Belle River—3,000 S3.  
 Cook's pond-Newton River—1,500 S3.  
 Glenfinnan Lake—43,765 R3.  
 Hope River—4,000 S3.  
 Lane's brook-Vernon River—1,200 S3.  
 McMillan's pond-Vernon River—2,500 S3.  
 McMillan's pond (Wood Islands)—3,000 S3.  
 McPherson's pond-Pinette River—3,000 S3.  
 O'Keefe's or Pisquid Lake—43,765 R3.  
 Parson's pond-Glynde River—4,000 S3.  
 Ross' pond-Vernon River—3,000 S3.  
 Simpson's pond-Hope River—3,000 S3.  
 Watt's stream-Winter River—1,565 S3.  
 West River—5,000 S3.

## KELLY'S POND HATCHERY

*Kings County—*

Big brook-Fortune River—4,000 S2.  
 Big pond (Hermanville)—3,000 S2.  
 Dingwell's stream-Fortune River—1,500 S2.  
 East or Hillsborough River—1,500 S2.  
 Finlayson's pond-Greek River—2,000 S1.  
 Goose or Cow River—2,000 S2.  
 Leard's pond-Morell River—3,000 S2.  
 MacLeod's pond-Murray River—3,000 S1.  
 Marie River—10,000 A1.  
 McRae's pond-Montague River—3,000 S1.  
 Midgell River—37,000 A1.  
 Morell River—165,000 A1, 5,830 A2.  
 Naufrage River—3,000 S2.  
 Ross' pond-Boughton River—1,500 S2.  
 St. Peter Bay, head of—25,000 A1.  
 Warren's pond-Head of East or Hillsborough River—2,000 S1.

*Prince County—*

Barlow pond-Grand River—2,000 S2.  
 Bell's stream-Prevost Cove—1,500 S2.  
 Black pond (Horse Head)—1,500 S2.  
 Brae River—2,000 S2.  
 Carr's stream-Malpeque Bay—1,500 S2.  
 Clark's pond-Wilmot River—4,000 S1.  
 Currie's pond-Lit. Pierre Jacques River—3,000 S2.

Dunk River—5,605 S2.  
 Ives' pond-Tryon River—1,500 S2.  
 Leard's pond-Trout River tributary to Lot 10 River—2,000 S2.  
 Marchbank's pond-Trout River (Tyne Valley)—2,000 S2.  
 McAusland's pond-Mill River—2,000 S2.  
 Rix's pond-Kildare River—2,300 S2.  
 Waddells pond-Traverse Cove—1,500 S2.  
 Wright Leard's pond-Dunk River—1,500 S2.

*Queens County—*

Bagnall's pond-Hunter River—2,000 S1.  
 Black River-Tracadie Bay—2,000 S1.  
 Clark's stream-East River—3,000 S1.  
 Coles' pond-North River—3,000 S1.  
 Craswell's pond-Hunter River—3,000 S1.  
 Crooked creek-Wheatley River—2,000 S1.  
 Dixon's pond-De Sable River—4,000 S2.  
 Gates' pond-North River—2,000 S1.  
 Glenfinnan River—780 S2.  
 Holms' pond-De Sable River—2,080 S2.  
 Leard's pond-Crapaud River—2,500 S2.  
 McLean Brothers pond-West River—1,500 S2.  
 Rackham's pond-Wheatley River—4,000 S1.  
 Watt's stream-Winter River—1,595 S3.  
 West River—5,000 S2.  
 Winter River—4,000 S1.

## APPENDIX NO. 4

## REPORT ON OYSTER CULTURE WORK UNDER THE DEPARTMENT OF FISHERIES FOR THE YEAR 1944-45

By C. J. KERSWILL, *Fisheries Research Board of Canada*

The Department of Fisheries has carried on oyster culture work in Prince Edward Island since 1928 and in Nova Scotia since 1934. The Dominion Government obtained jurisdiction over the oyster areas of these two provinces in 1928 and 1936, respectively, and policies of leasing grounds for oyster farming were then developed. In New Brunswick the Shediac area was transferred to Dominion jurisdiction in 1931 and work was carried on there for two years, but, owing to uncertainties regarding public health control, development was postponed until 1940 when investigations were resumed. In 1944 jurisdiction over the oyster areas of Gloucester County, N.B., was transferred to the Dominion Government.

The department co-operates with the Fisheries Research Board in investigations designed to develop and demonstrate suitable methods of oyster culture for the various districts where grounds may be leased. Headquarters are at the Prince Edward Island Biological Station on Bideford River in the Malpeque Bay area where areas have been reserved by the department for oyster farming demonstrations. The methods which are developed here have wide application but many other places have special problems requiring local investigation. Other experimental farms are operated at Orangedale in the Bras d'Or Lakes area, Malagash on Northumberland Strait and on a small scale at Shediac, N.B., and at Shippigan, N.B. They are useful for developing and demonstrating to lessees oyster culture methods and also for supplying at cost price oysters and separated spat suitable for stocking leaseholds.

Since the outbreak of war keen interest in oyster farming has been maintained but the amount of work done by lessees has been greatly reduced, especially in Prince Edward Island. It is important that the experimental farming work of the department continue as usual to maintain the confidence and interest of lessees and facilitate resumption of their work after the war.

## A.—PRINCE EDWARD ISLAND

*Malpeque-Cascumpeque Region.*—Beginning in 1915 a mortality of oysters left this region almost devoid of a stock which had been abundant and noted for its fine quality. By an agreement with the Provincial Government in 1928 the Dominion Government obtained jurisdiction over all the oyster areas of the province for the re-establishment of the industry. Preliminary investigations were begun at Ellerslie that year and scientific research on methods of oyster cultivation in 1929. Leasing of grounds for oyster culture began in 1931 and the related administrative work, including the interviewing of applicants for leases, the examining and surveying of areas, and provision of stock for lessees has been done by the Prince Edward Island Biological Station.

As shown in Table I the quantity of oysters marketed and the expenditure on development of leased areas was higher this year than in 1943. The number of spat collectors put out by lessees was much lower this year than in the past few years but many large orders have been received for spat collected by the department in 1944 for delivery in the spring of 1945. This year total receipts exceeded total expenditure by over \$4,400 as compared to only about \$2,000 in 1943. This was largely a result of greater receipts from the sale of oysters in 1944, amounting to over \$26,000 as compared to about \$21,000 in the previous year. It is expected that oyster farming can be placed on a more and more profitable basis as more economical methods are developed.

*Regions Affected by More Recent Mortalities.*—A mortality commencing in 1933 destroyed the public fishery in Enmore and Percival rivers. Similar destruction of the oyster fishery in Hillsborough River, some inlets east of Charlottetown and neighbouring north shore bays began in 1935. Evidence has been obtained that these mortalities were caused by the same disease as entered the Malpeque-Cascumpeque region in 1915.

Experiments at Enmore River and Johnston River have shown that Malpeque Bay oysters are now resistant to the disease, having been bred from a few survivors, whereas oysters being produced in the regions recently affected are still susceptible. To establish disease-resistant stock in affected areas the department offers for sale to lessees Malpeque oysters—under marketable size—produced on its reserve in Bideford River. Interest in oyster farming as a means of re-establishing the industry has increased recently, especially in the Alexandra-Pownal and Enmore-Percival districts. This year 238 gallons of separated spat and 55 barrels of small oysters were sold to stock such areas and since 1941 a total quantity of 559 gallons of separated spat and 244 barrels of oysters have been sold.

*Bedeque Bay.*—There are large public fishing beds in Summerside Harbour but they are closed to direct marketing because of pollution. Oysters must be re-laid for one month to adjacent approved coves for purification before marketing. Several leaseholders in Salutation, Sedgewick and Sunbury coves purchase many oysters from public fishermen during the summer re-laying period, transfer them to their areas and market them in the fall. The summer fishing has improved conditions for natural spat collection on the Summerside beds and the area can now support a large fishery without danger of depletion. In 1944, 3,210 barrels were re-laid as compared to 2,300 in 1943, 2,137 in 1942 and 1,335 in 1941. Of these, 2,753 barrels were refished and marketed as compared with 1,754, 1,975 and 1,065 in the three previous years. The methods of handling and marketing the re-laid oysters require improvement because the oysters have often been re-planted too thickly, causing poor condition before marketing. The lessees have been given advice on the proper procedure based upon re-laying experiments of the department and such assistance must be continued.

*Provision of Planting Stock.*—In the Malpeque-Cascumpeque, Bedeque Bay, Enmore-Percival, and other regions, permits are issued to lessees to pick oysters in the shore zone for stocking their areas. The period of picking is limited to several weeks in the summer when tides are suitable and when the operations can be supervised with least risk of illegal marketing. Many well-shaped oysters are transferred to deeper water, thus saving them from winter killing. This year about 425 barrels were picked and re-planted.

## B.—NOVA SCOTIA

In 1936 the Dominion Government obtained jurisdiction over the oyster areas in Nova Scotia and investigations on methods of oyster farming commenced that year. Experimental stations where oyster culture methods suited to the special local conditions could be tried were established in 1936 at Orangedale in the Bras d'Or Lakes area and in 1937 at Malagash on Northumberland Strait. At the outbreak of war development of private oyster areas had just commenced and as yet it has been undertaken on only a small scale. Experiments in spat collection and rearing and in predator control are providing information which will be useful in the future development of the industry. The development of oyster farming from 1939 to 1944 in the Bras d'Or Lakes and along Northumberland Strait is summarized in Table II.



## BRAS D'OR LAKES

Owing to the low salinity of the water, oysters here have weak shells, thin meats and fresh flavour so that the product is relatively low in value when marketed in the shell. Natural spat production is good and methods of artificial spat collection have also been developed. Development of the cheapest possible methods of production and improvement in marketing are needed.

*Marketing of Shucked Oysters.*—In 1939 an attempt was made to market Bras d'Or Lakes oysters as shucked meats in bulk, through the co-operation of the Department of Fisheries and the Nova Scotia Marketing Board. As shown in previous annual reports the yield of oyster meats per barrel was low at first and the venture appeared to be unprofitable but results have been better in later years.

This year 1,381 barrels were shucked giving an average yield of 1.5 gallons per barrel and the average price received was \$6 per gallon. In 1943 only 850 barrels were shucked averaging 1.3 gallons per barrel but obtaining an average price of \$6.60 per gallon. An average yield of 1.5 American gallons per barrel, was, however, obtained in 1942, when the average price received was only \$5.30 per gallon. By marketing as shucked meats, oysters which would sell in the shell for only \$2 or \$3 per barrel now are worth from \$6 to \$7 per barrel. The present high price of shucked oysters is largely the result of the wartime embargo on importations from the United States which was lifted during the winter of 1943-44. Towards the end of 1944 lower prices were received as a result of the lifting of the embargo and it is expected that prices for Canadian shucked oysters will fall still lower. The wartime price of American shucked oysters is about \$4.50 per gallon, much higher than before the war, and since the quality of Bras d'Or Lakes shucked oysters compares favourably with the American product, it is possible that shucking will continue to be profitable.

*Development of Leased Areas.*—Table II shows the number of areas in the Bras d'Or Lakes under cultivation, the expenditure in work and materials and the quantity of oysters marketed from leased areas from 1939 to 1944. The effort to grow oysters has been relatively small because of the marketing difficulties but in 1944 the quantity of oysters sold from leaseholds was 765 barrels, the greatest production so far. There was also an increase in the money spent for materials and in the work done by lessees as compared to 1943-44.

## NORTHUMBERLAND STRAIT

The principal areas are Tatamagouche Bay, Caribou Harbour, Pictou Harbour and Merigomish Harbour. Conditions are suitable for the production of higher quality oysters than in the Bras d'Or Lakes, and the principal problems concern production rather than marketing. These problems have been largely solved at Malagash and the results of the investigations with further modifications will be useful in developing oyster farming elsewhere.

*Development of Leased Areas.*—The development of private oyster farming along the Northumberland Strait from 1939 to 1944 is shown in Table II. As compared to previous years there was a great increase in the quantity of oysters planted, some increase in the quantity sold, more money spent for materials and more work done by lessees. This resulted in a total expenditure of work and materials of \$5,096, which exceeded the 1942-43 total by more than \$1,000 and is over four times the 1939-40 total. The table shows that since 1941 the development work in Northumberland Strait has been much greater than in the Bras d'Or Lakes. This is largely the result of the work of a few enterprising lessees in Merigomish Harbour and of increasing interest in re-laying



oysters from polluted parts of Pictou Harbour to uncontaminated leases in Middle River. In the present re-laying period 182 barrels were re-laid to areas in the latter area and 95 were fished again and marketed. Lessees at Pictou and Caribou are now obtaining spat for stocking their areas from the department's experimental farm at Malagash and it is expected that there will be an increasing demand for this stock.

### C.—NEW BRUNSWICK

*Gloucester County.*—This year the most important change in policy affecting the work of the department was the transfer in May of jurisdiction of oyster leasing in Gloucester County, N.B., from the Provincial to the Dominion Government. In this county over 160 leases were issued by the New Brunswick Department of Lands and Mines since 1938, most of the areas being in the vicinity of Shippigan. A policy governing the transfer of the provincial leases to the federal department and the issuing of new leases was drawn up this summer. A thorough survey of the region was made in September during the public fishing season to delimit the public fishing areas. During the year over 200 new applications for leases have been received. New problems of oyster culture require solution, especially the collection of oyster spat. The leases now in effect have been well stocked with small oysters picked by hand along the shores at low tide but natural reproduction is erratic and a dependable source of seed stock is urgently required for the numerous leases which will soon be in effect. In the past two summers an investigator has been stationed at Shippigan and progress has been made towards developing suitable spat collection methods.

*Shediac Area.*—The Dominion Government has had jurisdiction over the oyster areas of Shediac Bay since 1931 but no leases have yet been issued there. Investigations at Shediac were postponed in 1933 owing to uncertainty of the public health situation but they were resumed in 1940 and in 1942 a small experimental farm was established. The investigations from 1940 to 1942 showed that the chief problem at Shediac is the lack of a dependable natural spat production and later observations have indicated that there is at present only a very small area available for leasing. The problem is discussed further under "Results of Investigations and Experiments".

*Miramichi Area.*—In 1943 a survey of the oyster areas of the Miramichi River indicated that some beds could be opened to supervised fishing by lessees for stocking their areas, since environmental conditions on them are such that few oysters ever reach marketable size and the stock is of poor quality. In 1944 arrangements were made for holders of leases in the lower part of the Miramichi River, where a scarcity of seed stock exists, to fish oysters for two weeks in July from the upper part of the river where there is no public fishery. It is hoped that in 1945 an investigator can be stationed on the Miramichi to obtain data on hydrographic conditions and attempt artificial spat collection.

*Need for Oyster Farming.*—Oyster farming would likely bring about increased production and improve the quality in many areas. Educational work among lessees is necessary and the department now distributes its oyster farming circulars to New Brunswick lessees in French as well as English. It is planned to conduct illustrated lectures when a suitable set of slides illustrating farming methods elsewhere has been obtained.

## D.—GENERAL

## REVENUE

The sources of revenue from the department's oyster culture work include the sale of oyster spat and medium-sized oysters to lessees for stocking purposes, the sale of marketable oysters by tender from the department's reserved areas, and rentals and royalties on leases. This revenue goes to consolidated revenue and is not credited to the vote but it serves to reduce the actual net cost of the work to the government considerably below the amount expended under the appropriation. The appropriation in 1944-45, exclusive of cost of living bonus, was \$24,300. Through economy the expenditure was limited to \$19,800 and the revenue reduced the net cost to about \$13,800.

Table III summarizes the revenue received in 1944-45 and in several preceding years. The details of quantities of oysters marketed and the prices received in previous years may be found in a similar table in the preceding reports.

As compared to 1943-44 the prices tendered for marketable oysters were unusually high this year and more were fished from the department's beds, especially the downriver Cooper bed, largely accounting for the increase in total revenue of about \$860. More small oysters were sold at cost for stocking purposes and the price per barrel was increased from \$3 to \$3.50 to cover higher fishing expenses.

Recently the demand for "Standard Shape" oysters produced on the upriver beds in the department's reserve has decreased because oyster growers are having difficulty in disposing of low grade oysters produced on their own leaseholds. This largely accounts for the decrease in total revenue following 1941-42 when the revenue approached \$10,000 and is the maximum since the beginning of the present program of oyster farming. More of the upriver beds than formerly are now being fished during the summer to supply small oysters as mentioned above. Although relatively little revenue is obtained from this source the service is of great benefit to those who are beginning oyster farming operations in new places.

## RESULTS OF INVESTIGATIONS AND EXPERIMENTS

The investigations are described in detail in reports and bulletins of the Fisheries Research Board and only a brief review is given here.

Spatfalls were again predicted for all places where collectors are put out by the department and by lessees. Conditions were suitable for an early and abundant settlement of spat and final results were excellent on Prince Edward Island in the Malpeque Bay region, Enmore River, and Bedeque Bay, and in Nova Scotia at Malagash, Caribou, and Pictou. Further information was obtained on the most suitable places for spat collection in the Shippigan vicinity, N.B., and some collectors put out by lessees yielded promising results. The department will have available a large quantity of separated spat for sale to lessees in the spring of 1945, a service which is especially appreciated now when few lessees can put out collectors themselves.

The identification and description of various bivalve larvae found in plankton tows taken in the Malpeque Bay area was continued and photomicrographs were made of the larval stages of twelve different species including the oyster, the soft-shelled clam, the shipworm, and the razor clam. It is hoped that by the end of 1945 the free-swimming larval stages of all the bivalves common to the Malpeque Bay area will have been identified, described and photographed. The results will be useful in the training of the board's summer investigators. Ability to identify the larvae of numerous species of mollusks will also make possible observations on their occurrence and growth rate which may influence predictions of the most suitable time to set out oyster collectors.

At Malagash, N.S., the techniques of collecting spat on exposed tidal flats and of holding spat on collectors over winter in small tidal creeks have been developed satisfactorily and a dyke, retaining water over the flats, has been found excellent for rearing oysters during their second year. A considerable quantity of spat reared in the dyke to a size suitable for planting directly on leaseholds is desired in the Pictou and Caribou regions and it is planned to provide adequate stock for this requirement. The results of investigations at Malagash will be useful in solving the problems of oyster culture in similarly exposed places like Pownal Bay and Enmore and Percival rivers on Prince Edward Island where interest in oyster farming is increasing.

Further information was obtained on the problems to be solved in Shediac Bay before the prospects for successful oyster farming are encouraging. Spat introduced from Malagash and Orangedale, N.S., in 1943, continued to survive and grow well on floating trays, and the problem of failures in local spat production could evidently be solved by introducing spat from outside sources. At present there is little suitable ground available for leasing because much of the southern portion of the bay is closed to direct marketing for public health reasons and there is a large public fishing reserve to the north. Changes in the boundaries of the public fishing reserve, where stocks are now depleted, seem to be desirable.

Because there is no definite evidence that Bedeque Bay oysters were ever affected by the oyster disease, transfer of oysters from Malpeque Bay to Bedeque Bay and vice-versa is prohibited. With a view to determining whether the restriction is necessary, small transfers of oysters were made in the spring of 1943 from Bedeque Bay to Malpeque Bay and Enmore River. The oysters have survived and grown rapidly, suggesting that they are resistant to the disease and therefore that Bedeque Bay stocks were once affected. In 1944 spat were collected in Bedeque Bay and transferred to Malpeque Bay where they also appear to be thriving. The condition of the transferred stocks is to be observed for several years, because the disease does not usually become apparent until oyster spat are in their third year.

A group of experiments was carried out in Bideford River on the growth and condition of both small and large oysters to check previous data and to extend information on the most suitable type of tray, mooring location, and the general factors favouring growth under conditions resembling those used in oyster farming operations. New information was obtained on the value of rearing spat in the shade since direct sunlight inhibits growth. The effect of varying degrees of water circulation on growth rate and condition of oysters was demonstrated by the faster growth on beds free of eel grass than on grassy plots and by more rapid growth on trays placed where water currents are faster.

The food supply consisting of phytoplankton is indicated as an important factor affecting growth of both larval and adult oysters and an intensive investigation of its variations and their causes was started this year. The preliminary results showed that fluctuations in the abundance of plankton were correlated with fluctuations in the total hours of sunlight per week, and peaks in oyster growth immediately followed the peaks in plankton abundance. The experiments are to be continued on a more extensive scale in 1945.

The staff of the Laval Biological Station at Grand River, Quebec, were assisted with the organization of a series of experiments to determine whether oysters could be introduced into the waters of the Gaspé peninsula along the north shore of Bay Chaleur. Exploration in June of all probable sites showed that conditions were generally unfavourable for oysters owing to low water temperatures, low salinities, and exposure to storms. Paspébiac and Port Daniel were selected as the most promising places for investigation and oysters were introduced there from Shippigan and Malagash. The results of the investigations



will be available to the department and will be useful in extending our knowledge of the growth rate and reproduction of oysters under various conditions.

In addition to investigations pertaining directly to the oyster industry further observations were made on the distribution and growth rate of bar clams and extensive beds in Salutation Cove, near Summerside, were found to be well populated with small clams as well as larger clams which are now being canned locally. Also in the autumn a series of smelt gill-netting experiments was conducted in Bidford River to determine the quantity and grade of smelts caught in nets of five different sizes. Nets of  $1\frac{1}{8}$  inch mesh gave best results in this area.

The exploration of oyster areas preliminary to the leasing of grounds and the development of suitable administrative policies was continued in the three Maritime Provinces. This work occupies much of the time of the scientific staff.

#### GRADING AND INSPECTION

There has been great improvement in shipments of shell stock leaving the coast since new requirements for packing and grading oysters were introduced in 1941. Through meetings and personal contacts an effort has been made to instruct both the fishery officers and the packers in the proper interpretation of the regulations. Each fall an inspector has checked and reported on oyster shipments reaching Montreal and has interviewed dealers with a view to judging the effectiveness of the inspection, and determining the views of the trade.

This fall Inspector L. J. Murphy found at Montreal that the quality of the pack from some districts, especially from Gloucester County, N.B., was somewhat inferior to that of last year. Owing to very rapid growth of oysters in 1944 the proportion of thin-lipped oysters was greater than usual, making grading more difficult. The oyster production of Gloucester County was insignificant before 1940 but expanded greatly to a production of over 10,000 barrels in 1944. The department's staff is now inadequate to thoroughly inspect the pack and criticize the grading, and based on Inspector Murphy's observations it was recommended that the number of inspectors be increased. With the object of attaining greater uniformity in the pack it is hoped that a well qualified inspector can be employed during the whole marketing season to supervise the packing and grading of oysters throughout the Maritime Provinces and to instruct packers and inspectors.

It is important that the closest attention be given everywhere to the grading and inspection of oysters to ensure sound expansion of marketing, as the production of oysters increases through intensive oyster farming.

TABLE I.—OYSTER FARMING IN THE MALPEQUE-CASCUMPEQUE REGION 1935-44

	1935	1940	1941	1942	1943	1944	*Total 1935-44
1. Barrels of oysters planted.....	1,303	5,337	3,392	4,580	2,523	3,249	38,516
2. Concrete-coated spat collectors used (egg- crate fillers).....	3,350	82,500	51,824	28,610	18,480	3,600	427,264
3. Barrels of oysters sold.....	979	3,251	3,187	4,538	2,345	2,901	26,917
4. Receipts from sale of oysters (estimated at \$9 per bbl. 1941, 1942, 1943, 1944, \$8 previously).....	\$ 7,832	\$ 26,008	\$ 28,683	\$ 40,842	\$ 21,105	\$ 26,109	\$ 228,307
5. Wages paid by oyster farmers.....	\$ 2,137	\$ 12,485	\$ 11,533	\$ 8,538	\$ 8,268	\$ 8,450	\$ 104,331
6. Money spent for materials used.....	\$ 1,665	\$ 8,914	\$ 10,696	\$ 10,155	\$ 6,035	\$ 7,263	\$ 114,890
7. Total cash expenditure.....	\$ 3,802	\$ 21,399	\$ 22,229	\$ 18,693	\$ 14,303	\$ 15,713	\$ 219,221
8. Days' work by lessees or unpaid assistants.....	\$ 1,126	\$ 5,085	\$ 4,077	\$ 4,077	\$ 2,696	\$ 3,419	\$ 40,687
9. Value of (8) at \$1.75 per day.....	\$ 1,971	\$ 8,899	\$ 7,134	\$ 7,134	\$ 4,718	\$ 5,983	\$ 71,203
10. Total expenditure.....	\$ 5,773	\$ 30,298	\$ 29,799	\$ 25,827	\$ 19,021	\$ 21,696	\$ 290,424
11. Excess of total expenditure over receipts.....	-\$ 2,059	\$ 4,290	\$ 1,116	-\$15,015	-\$ 2,084	-\$ 4,413	\$ 62,117
12. Excess of cash expenditure over receipts.....	-\$ 4,030	-\$ 4,609	-\$ 6,454	-\$22,149	-\$ 6,802	-\$10,396	-\$ 9,086

\* Includes 1936, 1937, 1938, 1939 figures which are not shown in detail.



TABLE II.—OYSTER FARMING IN NOVA SCOTIA, 1939 TO 1944

	1939-40		1940-41		1941-42		1942-43		1943-44		1944-45		Total 1939-44	
	Bras d'Or	North. Strait	Bras d'Or	North. Strait	Bras d'Or	North. Strait	Bras d'Or	North. Strait	Bras d'Or	North. Strait	Bras d'Or	North. Strait	Bras d'Or	North. Strait
Number of areas under cultivation.....	70	27	103	28	131	55	137	62	161	66	173	72	173	72
Approximate total area.....	151	95	221	91	255	188	244	204	317	209	367	224	367	224
Barrels of oysters planted.....	130	313	218	226	163	772	205	535	96	257	96	1,291	908	3,394
Barrels of oysters sold.....	413	294	393	265	418	676	450	596	473	652	765	668	2,912	3,151
Wages paid for development.....	\$ 44	\$ 60	\$ 18	\$ 110	\$ 17	\$ 927	\$ 24	\$ 1,171	\$.....	\$ 2,281	\$.....	\$ 1,947	\$ 103	\$ 6,496
Money spent for materials.....	\$ 479	\$ 193	\$ 276	\$ 123	\$ 482	\$ 723	\$ 655	\$ 2,016	\$ 473	\$ 652	\$ 557	\$ 2,042	\$2,922	\$ 5,749
Days' work by lessees.....	388	515	401	379	418	1,007	515	409	498	586	635	633	2,855	3,529
Value of time by lessees at \$1.75 per day.....	\$ 678	\$ 902	\$ 702	\$ 663	\$ 731	\$ 1,763	\$ 900	\$ 715	\$ 872	\$ 1,025	\$1,111	\$ 1,107	\$4,994	\$ 6,175
Total value work and materials.....	\$1,201	\$1,155	\$1,096	\$ 896	\$1,230	\$ 3,413	\$1,578	\$ 3,902	\$1,345	\$ 3,958	\$1,668	\$ 5,096	\$8,021	\$18,420

TABLE III.—REVENUE FROM DEPARTMENT'S OPERATIONS IN 1944-45 COMPARED WITH SOME PREVIOUS YEARS

	1944-45	1943-44	1942-43	1941-42	1940-41	1938-39
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Sale of cardboard collectors bearing spat.....						505 20
Sale of wire containers for spat collectors.....						36 20
Sale of separated spat—416 1/7 gals. @ 70¢.....	291 30	343 35			235 40	
Sale of separated spat @ 65¢.....		97 50		154 60		
Threshing spat from 610 collectors @ 2¢.....	12 20	3 00			20 08	
Threshing spat from 1,860 collectors @ 1½¢ each.....				27 90		
Sale of 156 bbls. small oysters for stocking areas @ \$3.50 per bbl. (\$3.00 previously).....	546 00	415 50	579 00	400 50	78 00	579 00
Sale of marketable oysters (average price \$12.57 this year; \$9.51 in 1943-44).....						
Substandard, 48½ bbls. @ \$6.00, 75 bbls. @ \$8.10.....		291 00		607 50		
Standard, 101 bbls. (1 @ \$11.10, 100 @ \$10.17).....	1,028 10	617 33	2,915 05	4,471 20	2,908 80	1,510 00
Choice, 68 bbls. (32 @ \$13.75, 36-9 @ \$13.17).....	925 98	336 00	842 30	742 41	917 70	1,196 00
Fancy, 34 bbls. (29 @ \$18.10, 5-2 @ \$16.57).....	611 06	441 35	747 30	822 12	1,377 80	1,293 78
Sale of 13 bbls. oysters from St. Ann Bay, N.S.....						57 32
Sale of 18 bbls. oysters from Malagash, N.S., @ \$5.69.....				100 89		
Sale of 3 bbls. 3 pks. oysters from Buc-touche, @ \$5; \$6 in 1940.....				16 50	216 00	
Sale of 68 gals. of spat from Bras d'Or lakes @ 50¢.....				34 00		
Logs purchased from department by H. V. Carr.....				15 00		
Fees for resurveys of boundaries of leases.....			5 00	4 00		21 50
Royalty on oysters taken from leases and rentals on leases.....	2,658 64	2,667 88	2,494 14	2,503 69	2,308 50	1,758 27
	\$6,073 28	\$5,212 91	\$7,582 79	\$9,900 22	\$8,062 28	\$6,957 27

## APPENDIX No. 5

## ANNUAL REPORT OF THE ENGINEERING DIVISION

By C. BRUCE, M.E.I.C., *Chief Engineer*

The Engineering Division is responsible for all of the technical works of the Department in the Maritime Provinces, British Columbia and the North-west Territories where the administration of the fisheries is entirely or largely under the Federal Government. Generally, these works include the removal of obstructions in streams which impede or prevent the ascent of fish to suitable spawning grounds; the design and supervision of the construction of fishways, cold storage and other buildings connected with the fisheries and fish cultural establishments. The division also administers the work in connection with oyster and other mollusc fisheries in the Maritime Provinces, including the leasing of ground for oyster farming.

## BUILDING FISHWAYS AND CLEARING RIVERS

Works under this head include: (a) surveys and the preparation of designs for adequate fishway facilities for dams which prevent the ascent of fish to suitable spawning grounds and to overcome natural falls or impassable barriers to their ascent, and (b) the removal of artificial obstructions.

Where dams are privately owned, the owners or occupiers are required to instal and maintain adequate fishway facilities therein, in conformity with the requirements of the Fisheries Act, but, as those not conversant with the design of fishways are quite unlikely to provide structures that will prove efficient, it has been the policy of the Department to require that all fishways shall be built in accordance with designs prepared by the Engineering Division. This involves a study of each situation and, after the collection of data and the completion of the necessary ground surveys, the design of a fishway to best meet the conditions peculiar to the situation.

The removal of artificial obstructions includes many varieties of work, depending on the character and extent of the barriers. Particularly in British Columbia, where the country is mountainous, obstructions are liable to accumulate frequently due to extreme freshets, which carry down forest rubbish, and under some conditions may undermine the banks, causing large trees to fall into the water. Many such conditions require immediate action to insure that channels are opened to provide for the ascent of the season's run of fish as otherwise adequate seeding of the spawning grounds would be entirely prevented. Unless obstructions are of a major character, requiring the advice of an engineer, their removal is usually undertaken under the supervision of the local fisheries inspector after the need has been established.

The works undertaken during the year are classified and reviewed hereunder:—

## NOVA SCOTIA

*North River, Victoria County.*—Reference was made in the annual report for 1941-42, to the construction of a fishway to facilitate the ascent of salmon over a falls in this river. This fishway was effective in passing salmon until the spring of 1944 when two large rocks became dislodged from the canyon wall, falling directly into the pool below the entrance. It was necessary to remove these rocks to make the fishway effective again.

*Tangier River, Halifax County.*—In 1935, a company organized to operate old gold mine workings at Tangier rebuilt the dam on this river to provide the necessary power. Immediate steps were taken to require the company to

provide a fishway in the dam but due to financial difficulties, and the plea that the operation of the mine was of more value to the community than the fish, the matter was not concluded. Negotiations were continued until finally the company went into liquidation. The matter was then taken up with the creditors, but as no assurance was obtained the Department made a large opening through the dam, which provides an unobstructed passage for the ascent of fish.

*Ecum Secum River, Guysboro County.*—An abandoned dam on this river, which had fallen into such a state of disrepair that it was blocking the passage of fish, was removed.

*Gaspereau River.*—Due to extremely dry weather and an increased power demand, the water level of Gaspereau Lake was so lowered that the outlet stream was dried, and many young salmon were stranded. A survey was made to determine the extent of work necessary to deepen the lake outlet to overcome this. As, however, this was an abnormal condition it was decided to defer action to complete the work until the need for it again arises.

#### NEW BRUNSWICK

*Chamcook Lake, Charlotte County.*—The Department has maintained a rack at the outlet of this lake for a number of years to prevent the descent of Landlocked salmon. A survey was made to obtain information for the design of a new rack as the old one was in poor condition but, as it was not possible to have it made in time to prevent salmon from descending in the fall, the old one was temporarily repaired.

*Miramichi River Area, Northumberland County.*—Reference was made in the annual report for 1943-44 to the removal of obstructions from several brooks, tributary to the Miramichi River, to increase the spawning areas for smelts. Work in this connection was continued during the year under review. In one instance it was found that lumberers had completely blocked a stream with slash from their operations. They were required to entirely remove this.

#### BRITISH COLUMBIA

*Atnarko River.*—An inspection of a part of this river, about fifty miles from the mouth revealed that in a section of about five miles, where the stream is subdivided into several channels, some of these had become blocked with debris and logs in such a manner that the ascent of fish would be prevented particularly during low water stages. The season was too advanced to undertake the work but the necessary explosives were procured and it will be proceeded with early in 1945.

*Yakoun River.*—An inspection late in the year revealed that three log jams had formed in this river, the largest being some four miles from the mouth and the others five and twelve miles up. It was planned to undertake removal of these jams in the early spring but continued high water conditions prevented this being done. The necessary explosives were procured and the work will be undertaken during the summer of 1945 after the salmon fry are out of the stream.

*Whiskey Creek.*—This creek, tributary to Little Qualicum River and having valuable spawning grounds, was found, on inspection, to be obstructed by the remains of an old logging railroad bridge which had rotted and fallen into it. Explosives to assist in the removal of the obstruction were procured but high water prevented completion of the work at that time.



*Rosewall Creek.*—A careful inspection of the lower end of this stream was made with a view to determining if it would be practicable to improve the unsatisfactory conditions then existing from the standpoint of the fisheries. Immense quantities of gravel had been carried down the stream and deposited in the comparatively level section below, filling the stream bed up to a level higher than the low-lying banks in some places, with the result that, during freshets, the water spread over the land in a number of undefined channels, none of which afforded adequate means for the ascent of fish. During low water periods in the summer the water seeped underground through the gravel, thus leaving the stream dry for some distance. Heavy freshets during the late fall and winter entirely changed the situation by opening up new channels which the owner of adjacent land has improved with a view to protecting his property from further damage.

In view of the entire uncertainty regarding its permanency the Department reached the conclusion that no work looking to improving conditions for fish should be undertaken at the present time.

*Puntledge River.*—An inspection and preliminary survey of the situation at the impounding dam at the foot of Comox Lake were carried out with a view to the establishment of a fishway. With this information and hydrometric data procured from the Canadian Collieries (Dunsmuir) Limited, owners of the dam, a design for a fishway was subsequently prepared.

*Sally River.*—An obstruction to the ascent of fish, consisting of a mass of drift timber and assorted debris, was removed.

*Pine River.*—The obstruction in this river consisted of a number of very large boulders located in the channel in such a manner as to almost block it during low water stages. These boulders were removed.

*Bush Creek.*—The obstruction consisted of a log jam lying in the creek about one-half a mile above tide water. It had been forming for a number of years and during the past season freshets brought down a considerable further amount of debris which threatened to close the creek completely. The necessary clearing work to provide a free passage up stream for salmon was completed.

*Quinsam River.*—A number of falls on this river in the first mile below Lower Quinsam Lake made the upstream passage of fish difficult. A pool was excavated on the sloping rock on the face of the lower falls where the main obstruction existed. Immediately above this a depression was excavated to break the velocity of the water flow. Work was also proposed at one of the intermediate falls but due to water conditions this had to be deferred for the time being. Later inspection revealed, however, that coho salmon reaching the falls ascended to the lake without great difficulty, which was evidence that the work was effective, at least so far as the water levels then obtaining were concerned.

## FISH CULTURAL ESTABLISHMENTS

No new establishments were built during the year but, in addition to ordinary maintenance, improvements were carried out where this was in the interests of efficiency.

The works are reviewed hereunder:—

### NOVA SCOTIA

*Bedford Hatchery.*—It was necessary to construct a cribwork measuring 95 feet in length along the bank of Sackville River where freshets threatened to cause damage to the hatchery property. The area behind the cribwork was graded and seeded.



*Cobequid Hatchery.*—The extreme freshet in Second River, referred to in the 1942-43 report, in addition to causing considerable damage to the water supply dam, carried down immense quantities of gravel which were deposited in the pond above the dam. As this was causing difficulty with the water supply the pond was drained and the gravel removed with a bulldozer. In order to facilitate future cleaning of the pond, one of the gates in the dam, which were of a stop-log type, was replaced with a lifting gate.

A chimney was built in the workshop and the galvanized iron retorts of the cold storage room, which had become pitted from erosion, were renewed.

*River Phillip Salmon Pond.*—The cribwork forming the inlet and the retaining dam at the lower end of this pond were rebuilt.

*Coldbrook Rearing Pond.*—A survey was made in connection with leakage which had developed in the water supply dam.

*Lindloff Hatchery.*—An instrumental survey was made for the construction of a new water supply dam at the foot of Lindloff Lake. Consideration was given to the possibility of increasing the height of the dam to provide some additional storage in the lake. A concrete floor was laid in the hatchery replacing the original earthen floor with wooden walks, the latter having become so rotted that replacement was necessary. The grounds at this hatchery slope up steeply on both sides of the stream running through the property and level ground on which rearing ponds could be built is accordingly non-existent, except on a small flat which previously formed the bottom of a mill pond immediately below the lake. Circular ponds have been constructed on this flat but in order to provide for future expansion it was decided to bench an area on the side-hill at a sufficiently low level to admit of providing a gravity water supply from the lake. An area some 200 feet long was graded and stone cribbing placed to prevent sloughing. Additional levelling was also done to provide an area for setting up sixteen rearing tanks, each measuring 13 feet long, 24 inches wide and 15 inches deep.

*Margaree Hatchery.*—A large rectangular trout rearing pond at this hatchery, which was furnished with a water supply at the upper end and an overflow at the lower end, was difficult to keep cleaned. As a means of overcoming this and rendering it more efficient the corners were rounded and a central outlet installed, thus converting it to a circular pond in which the water has a circulatory motion towards the outlet. A new 6-inch wood stave supply pipe was laid, replacing the iron pipe which had become corroded. In addition, several of the long rearing ponds were modified and repaired.

*Middleton Hatchery.*—A new icehouse with feed room was built to replace the old building which, in addition to being very badly rotted, was too small for present operations.

*Kejimikujik Rearing Ponds.*—The water supply dam at the foot of Grafton Lake was repaired and a new foot bridge, giving access to the circular ponds, was built across Grafton Brook. Four troughs with the necessary water supply and drainage were set up for experiments in rearing.

*Yarmouth Hatchery.*—Following an instrumental survey and the preparation of plans, the construction of two circular ponds each 50 feet in diameter, was commenced under the supervision of the hatchery superintendent. As the excavation proceeded solid rock was encountered and it was necessary to defer completion until the necessary machinery for excavating the rock is available.

## NEW BRUNSWICK

*St. John Hatchery.*—As the outside rearing troughs at this hatchery were in poor condition and, moreover, did not afford sufficient capacity, it was decided to increase capacity by building new and larger troughs at another location where more space was available. Difficulties were encountered in obtaining suitable material for the troughs and the installation was not completed. It was, however, decided to lay two lines of 8-inch wood stave pipe (some quantity of which was salvaged from the old system) from the water supply reservoir to a point immediately outside the main hatchery building, replacing two 6-inch iron pipes. The added capacity will afford water both for the hatchery and the outside troughs, and when the former is closed in the summer the supply to the latter can be augmented when an increased supply is desirable due to high water temperatures.

*New Mills Salmon Retaining Pond.*—As the cribwork dam, across the estuary of New Mills Brook which forms this pond, is in need of repairs, consideration was given to the construction of a concrete dam to replace it. At the same time the desirability of increasing the pond area was given consideration and a survey for a new dam farther down the estuary was made.

*Charlo Hatchery.*—Ten circular ponds were lined with concrete replacing the clay and gravel linings.

## OYSTER CULTURE

The issue of oyster leases in Prince Edward Island and Nova Scotia, where jurisdiction is under the Federal Government, was continued during the year under review.

In Prince Edward Island 69 leases were completed, making a total of 1,288 since leasing commenced in 1932. Of these 1,288 leases 538 have been cancelled, or abandoned by the lessees, leaving a total of 750, having a combined area of 1,780 acres, in effect. Since the outbreak of war development work on leases has lessened to a considerable extent, but it is quite possible that when lessees who have been on active service return to civil life and others who engaged in wartime work return to their former occupations, there will be a revival of activity, and that some of the cancelled leases will be reinstated. In addition to the leases issued, 858 applications were before the Department for consideration at the close of the year.

In Nova Scotia 22 leases were issued, making a total of 286 since leasing commenced in that province in 1938. Cancellations and abandonments have totalled 41, leaving 245 leases, having a combined area of 591 acres, in effect, while 90 applications were before the Department for consideration.

During the year the jurisdiction of leasing ground for oyster culture in Gloucester County, New Brunswick, was transferred by agreement from the Provincial to the Federal Government. More than 160 leases, issued by the province, were in effect when the transfer was completed, and it was necessary to formulate a policy for the transfer of these leases to Federal jurisdiction and also for the issue of new leases.

Immediately following the transfer, large numbers of enquiries from local people who desired to apply for leases were received, but the Department was unable to deal finally with them as it was necessary to first establish the limits of public fishing areas, where no leases would be issued. It was considered that this could best be done during the legal fishing season, which opened in September, as information regarding the locations of beds which actually supported a profitable fishery could then be readily obtained. By

actual survey and general agreement with the local oyster fishermen, the limits of all public fishing beds were defined. A notice to all interested in oyster farming in Gloucester County, setting forth the conditions under which leases would be granted, was issued and circulated to those who had made enquiries, and they were invited to submit applications for leases on forms prepared for the purpose. More than 200 applications were received and it expected that as many of these, as well as others which will continue to be received, as can be handled, will be dealt with and leases issued during the coming year.

As there were no maps or plans of the Gloucester County areas on a scale large enough for adequately plotting leased areas, it was necessary to prepare them by enlarging such smaller scale maps as were available to the required scale. Three large sheet plans covering the areas in the St. Simon, Shippegan and Lamèque were completed.

#### SURVEY WORK

Surveying in connection with oyster cultural work includes the establishment of boundaries of all areas to be leased and other related works. During the year under review the following surveys were undertaken:—

1. Seventy-four areas for leases in Prince Edward Island were surveyed and 32 re-surveys to establish the boundaries of leased areas, the markers of which had been lost or destroyed, were made.
2. In Nova Scotia 25 surveys and two re-surveys were made.
3. Survey monuments in the Malpeque Bay area which had been destroyed were replaced and their correct positions, with respect to the co-ordinates of the grid lines in which leases are laid out, were established.
4. Beacon ranges, marking grid lines and lease boundaries, were established on Lot 12 Point in the Malpeque Bay area.
5. The boundaries of the reserve in Grand River, Malpeque Bay, set apart for lessees to obtain oysters for stocking their leaseholds, were established and marked.
6. All picking areas in Malpeque Bay were established and marked.
7. In connection with the preparation of correct plans of the Bras d'or Lakes oyster areas, the stadia survey of Whycocomagh Bay was completed. Monuments were established and a portion of the triangulation survey of Big Harbour was completed.
8. In the Shippegan area, in New Brunswick, the boundaries of the public fishing reserves in St. Simon Inlet (north and south branches) Pokisudi, Lamèque Bay and Little Lamèque Bay were established and marked.
9. The large scale sheet plan of the Whycocomagh Bay area was completed.

During the winter the unusual frequency of stormy weather, coupled with poor ice conditions, both in Prince Edward Island and Cape Breton, markedly curtailed field work. In Prince Edward Island a number of surveys for leases had to be deferred due to these conditions.

#### GENERAL

*Lobster Pound, Yarmouth, N.S.*—At the request of a group of organized lobster fishermen in Yarmouth and vicinity an engineer made a survey for a lobster pound which the group wished to build at Yarmouth Bar. Technical advice, including plans and bills of materials for the pound, was furnished to the group following the completion of the survey.



*Gaspe Fisheries Experimental Station.*—Reference was made in last year's report to the preparation of plans and specifications for the erection by the Fisheries Research Board of a new Experimental Station at Grand River, Gaspé County, Quebec. Tenders were subsequently received and a contract awarded for the construction of the station and the work was completed during the year, under the supervision of the Engineering Division. Obtaining a sufficient supply of fresh water for use in the laboratories was a matter of some concern. Previous information was to the effect that large surface wells would furnish an adequate supply, which was estimated at from 1,000 to 1,500 gallons per hour. Tests of existing surface wells, however, indicated that such information was not reliable and the possibility of obtaining the required supply by boring was then considered.

Investigation of the geological formation gave little promise of success, and while another bored well in the vicinity furnished a fair supply of water it was too saline, due to leakage of sea-water into it, for use in the station. It was, however, decided to bore a well as it was considered that, although the water in the existing well was saline, there was an even chance that no sea-water would enter one at another location. This proved to be the case and an adequate supply of fresh water was obtained at a depth of 150 feet.

*Inspection of Fish Processing Plants.*—In order to obtain information regarding present methods and with a view to securing information which might lead to improving these methods an engineer visited plants in the Maritime Provinces, British Columbia and the United States. In the Maritimes plants were inspected at Lunenburg, Glace Bay, North Sydney, Ingonish and Caraquet, while in British Columbia plants at Vancouver, Victoria and Stevenson were viewed. In the United States plants of the General Seafoods and Atlantic Coast Fisheries at Boston, Groton-Pew and General Seafoods at Gloucester, and the John O'Hara plant at Rockland, Maine, were inspected. En route from British Columbia, the Edmonton Cold Storage plant at Edmonton and the Manitoba Cold Storage Plant at Winnipeg were visited.

*Lameque Cold Storage Plant.*—This plant, owned by the Lameque Fishermen's Co-operative and subsidized under the Bait Freezer Regulations, was completed during the year. The plant was inspected by an engineer before payment of the subsidy was made.

*Inspections.*—General inspections by an engineer were made of the fishway in the Ross dam on Vernon River, P.E.I., the Cardigan Rearing Pond, P.E.I., in connection with repairs to the water supply dam, a dam at Annandale, P.E.I., built by provincial interests in connection with the trout fishery, the Sanitorium dam on the Pollett River, N.B., in connection with the proposal that a fishway should be installed, Florenceville Hatchery in connection with repairs to a leak in the water supply dam, Miramichi Hatchery in connection with repairs, Kouchibouguac River in connection with alterations to the fishway in the New Brunswick Electric Power Commission's dam, and the Tusket River, N.S., in connection with conditions for the ascent of salmon through fishways in the Nova Scotia Power Commission's power development of that river.



## APPENDIX No. 6

**REPORT ON THE WORK OF THE CANNED FISH INSPECTION  
LABORATORY, VANCOUVER, BRITISH COLUMBIA,  
FOR THE YEAR 1944-45**

By F. CHARNEY, *Chief Chemist*

The following report summarizes the main investigations and other work, which in addition to the routine examinations have engaged the attention of the laboratory during the past year.

(1) During the year 1944-45, the work on the quality of pink and sockeye salmon caught in the Gulf of Georgia as compared with the corresponding species caught in the Fraser River and immediate approaches thereto was completed. This investigation revealed no significant differences in quality of salmon taken from the two areas, when the Fraser River area is limited approximately to that part of the river below New Westminster. Samples taken above New Westminster, however, were in general inferior as regards the intensity of the red colour of the muscle tissue in comparison with samples taken in the Gulf of Georgia area. A full report on this investigation was forwarded to the Department on March 16, 1944.

(2) During the past year work has been continued on the method of determining the acid value of the oil of canned herring by means of the pH of the solution of the oil in benzene and alcohol and previously prepared titration curves. This work has shown that to obtain accurate results by this method it is necessary to control accurately the proportions of benzene, alcohol and water in the solvent.

(3) Further work has also been carried out on the discovery made last year that the acid value of the oil of canned herring parallels certain properties of the proteins in the aqueous liquid of the canned herring arising from post-mortem spoilage. Owing to delays in obtaining a galvanometer, however, and the encroachment of other problems, it was not possible to devote any considerable time to this problem.

(4) Time was spent during the past year in preparing apparatus for a projected investigation on the effect of temperature on the rate of post-mortem spoilage in herring. These experiments were to have been carried out in co-operation with the laboratory of a large fishing company, but owing to transportation difficulties arising from gasoline and tire shortage it did not prove feasible to proceed with the investigation.

(5) Some tests were carried out during the past season to determine the feasibility of running carbon dioxide values on the drained liquid of canned salmon as an alternative for the procedure followed at present in which the drained muscle tissue is employed. Unfortunately, since this investigation involves the preparation of experimental samples, it was not possible for the reasons mentioned in the preceding paragraph.

(6) Incubation tests on samples of canned salmon and canned herring were continued during the 1944-45 season, but no nonsterile tins were detected.

(7) Data collected by the laboratory over a number of years have shown that, with one exception, the refractive index of the oil provides an excellent means of identifying the species of British Columbia salmon and, hence, this test may be utilized to check the coding of a given sample of canned salmon. The exception arises in differentiating between pink and coho salmon, where the average refractive indices show only a small difference. An investigation was therefore undertaken recently with the object of supplementing this test by the use of measurements on the vertebrae in the sample. Preliminary work on this test indicates that, by applying Fisher's discriminant function method,

it will be possible to distinguish readily between the two species mentioned, and probably also between the remaining species of British Columbia salmon from simple measurements on the vertebrae.

(8) During the past season calculations were carried out to determine the nature of the distribution of the measure of firmness derived by the laboratory from the results of an investigation into the dynamics of the penetration of semi-rigid bodies, such as canned salmon, carried out at the laboratory some years ago. These calculations have shown that the values of the skewness and kurtosis of the distribution of the measure of firmness derived from dynamical considerations do not differ significantly from those of a normal distribution, namely, 0 and 3, respectively, and consequently, that this measure of firmness may be, for all practical purposes, safely considered normal.

(9) During the past year manuscripts reporting the results of some of the above-mentioned investigations have been prepared for publication.

## APPENDIX No. 7

### REPORT OF THE FISH INSPECTION LABORATORY (EAST), HALIFAX, N.S., FOR THE YEAR 1944-45

By ERNEST HESS, Ph.D.

The work of the Fish Inspection Laboratory (East) for 1944-45 can be summarized under the following headings:—

#### 1. GRADING

Due to the fixing by the Wartime Prices and Trade Board of higher maximum prices of canned lobster, chicken haddie, and mackerel fillets for "Fancy grade" Government-inspected goods as compared with other grades or ungraded lots, considerable grading was carried out for the first time. The following table gives a summary covering a net total of 226 certificates issued:—

Kind of Canned Fish	Number of Full Cases Submitted	Grade			
		Extra Fancy	Fancy	Standard	Below Standard
		%	%	%	%
Lobster.....	13,511	3.6	81.3	15.1	.....
Chicken Haddie.....	116,331½	.....	81.5	13.2	5.3
Mackerel Fillets.....	4,055	.....	96.5	3.5	.....

The lobster submitted for grading represents only that part of the total pack that was allocated to the Canadian market (20 per cent).

The grading procedures, i.e., the types of tests made, the different characteristics recorded for each can and its contents, the tolerances allowed, as well as the evaluation of the results of the examination for each can and for each sample as a whole, as established by the laboratory, have proved to be very satisfactory in practice.

#### Re-grading:

Appeals for the re-grading of two lots of canned lobster and 17 lots of chicken haddie were granted by the Minister. The lobster (total of 340 cases of 96 six ounce cans) were confirmed as Standard grade. Of the chicken haddie, in four lots (2,348 cases) the previous grading was confirmed, twelve lots (7,876½ cases) advanced in grade, and one lot (740 cases) was moved to a lower grade upon re-grading.

## 2. INSPECTION

*(a) Quality:*

At the request of the Canadian Export Board, canned mackerel (salmon-style) and herring offered for sale on account of UNRRA were inspected. Tentative standards for acceptable goods were drafted, submitted to the Canadian Export Board, and accepted. A total of 54,603½ full cases of mackerel, and 17,721½ cases herring (plain, pound talls) were inspected. Of these, 92 per cent and 91 per cent, respectively, were within the acceptable standards of quality.

The British Ministry of Food bought 21,645½ cases of Atlantic herring in tomato sauce subject to the inspection of the laboratory, as well as 20,000 cases of sardines in oil. Of 4,260 cases of lobster paste and tomalley submitted for sale to the Ministry of Food, 86 per cent were found acceptable according to standards established by the laboratory.

*(b) Weight:*

A total of 37 lots of canned fish (lobster 22, chicken haddie 4, mackerel 7, herring 2, mackerel fillets and Atlantic salmon, one each) were found to be underweight, as determined from samples submitted for grading or inspection or from routine samples examined by the fisheries inspectors or the laboratory. Of 16 lots which were re-inspected, following appeals to the Minister, 10 lots were confirmed as underweight, and six lots were released as correct.

## 3. ROUTINE SAMPLES

Samples of three cans each from the various types of canned fish of all fish and shellfish canneries in the Maritimes were withdrawn at weekly or bi-monthly intervals during the various canning seasons between April 1 and September 1.

A separate laboratory report was prepared for each sample and copies mailed to the canner and local fisheries inspector concerned. During the winter all these reports were reviewed and all canners having submitted samples showing inferior quality or workmanship received personal letters pointing out such defects and their remedies. A total of 1,093 of such 3-can samples were inspected, namely: chicken haddie, 254, lobster paste and tomalley, 208, lobster, 193, mackerel, 151, clams (all kinds), 111, herring (plain), 75, sardines, 24, herring in tomato sauce, 17, herring (smoked) kippered snacks, 16, mackerel fillets, 14, Atlantic salmon, 12, Atlantic tuna, 8, finnan haddie, 4, gaspercau, 3, silversides, mussels and shad, one each.

## 4. FIELD WORK

During the canning season all canneries in Prince Edward Island and New Brunswick canning chicken haddie, herring, summer and fall mackerel, sardines, and lobster were visited from one to many times, involving a total of over 400 calls. This covered routine visits to check on quality of fish used for canning and on canning technique, as well as visits to canneries from which inferior routine samples or inferior samples for grading or inspection had been received.

## 5. EDUCATIONAL

Two refresher courses for fisheries inspectors on canning were held in May, 1944, at Shediac, N.B., and Summerside, P.E.I., respectively. The writer took part in two short courses for fishermen arranged by St. Dunstan's University in November, 1944, in Prince County, P.E.I.



Circulars, originally prepared by the writer in the Atlantic Fisheries Experimental Station Canned Fish Circular series, were revised and re-issued to interested parties. They covered the canning of herring, mackerel, chicken haddie, lobster (Fancy grade), and shellfish. A new series of circulars, issued by the Fish Inspection Laboratory, has been started and two numbers distributed: No. 1 "Enamelled Cans", No. 2 "Routine Samples".

## 6. RESEARCH

A number of canning research problems have been attacked during the winter months. An investigation into the use of cereal filler in lobster paste and its rapid quantitative determination in the laboratory has led to the recommendation that such "fillers" should be limited to two per cent by weight of the finished paste.

A routine method to measure corrosion in unenamelled herring cans has been developed. This work led to the recommendation that all herring cans should be enamel-lined to come within the "Fancy" and "Standard" quality grading definitions, and the general suggestion to the trade to pack all fish products in enamel-lined cans.

An investigation into the absorption of free moisture in canned chicken haddie has shown that the rate of cooling of the processed cans and the storage temperature have a definite effect upon the rate of absorption, the latter being increased by rapid cooling and low storage temperatures.

## 7. LIAISON WITH TRADE AND ADMINISTRATIVE BRANCH OF THE DEPARTMENT

The laboratory has been in almost daily contact with the office of the Chief Supervisor of Fisheries. When in the field, the Director and staff have kept in constant contact with the fisheries supervisors and inspectors as well as with the assemblers and can manufacturers. All district conferences of the Department in December, 1944, were attended as well as the Supervisors' Conference in January, 1945. The Director also attended a canners' and assemblers' meeting at Amherst on August 1, 1944, the Annual Convention of the U.M.F. at Amherst on October 25-26, 1944, and he addressed the Commercial Club of Halifax on the subject of "Our Fish Canning Industry under Wartime Conditions".



# APPENDIX No. 8 STATEMENT OF REVENUE RECEIVED DURING FISCAL YEAR 1944-45

Class	Total	General Account		Nova Scotia		P.E.I.		New Brunswick		Quebec		Hudson Bay		British Columbia		Yukon		Northwest Territories	
		\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
ORDINARY REVENUE																			
<i>Privileges, Licences and Permits—</i>																			
Fishing Licences	40,051 50			4,875 50		988 75		9,286 25				1 00		24,265 00		600 00		35 00	
Modus Vivendi	208 00			55 00										153 00					
Oyster Leases	2,680 64			465 24		2,193 40		22 00											
Trawler Licences	1,583 33			1,583 33															
Rentals	5 00													5 00					
<i>Proceeds from Sales—</i>																			
Pelagic Sealing (Sales of skins)	374,743 20																		
Sales of Fish	159 00							159 00											
Sales of Oysters	3,457 38					3,457 38													
Sundry Sales	617 49			157 55				454 60											
<i>Services and Service Fees—</i>																			
Canned Salmon Inspection Fees	5,481 46													5,481 46					
Canned Herring Inspection Fees	5,808 61													5,808 61					
Chicken Haddie Inspection Fees	1,357 88			1,357 88															
Mackerel Fillets Inspection Fees	175 15			175 15															
Canned Lobster Inspection Fees	1,352 20			1,352 20															
Miscellaneous Services	42 20			30 00		12 20													
Premium, Discount and Exchange	4 13			3 15		0 10		0 30											
Refunds of Previous Years' Expenditure	1,609 99			84 33		1,054 65		113 35		39 41				160 71					
<i>Miscellaneous—</i>																			
Fines and Forfeitures	14,513 95			604 00		1,525 50		1,430 26						10,954 19					
Total Ordinary Revenue	453,911 11			375,058 87		9,231 98		11,465 76		39 41		1 00		46,887 97		600 00		35 00	
SPECIAL RECEIPTS																			
Previous Years' War Expenditure	265 49			186 00															
Miscellaneous War Revenue	25,489 02			79 49															
				25,489 02															
GRAND TOTAL	479,665 62			375,244 87		9,231 98		11,465 76		39 41		1 00		46,887 97		600 00		35 00	

Certified Correct,  
F. O. WEEKS,  
Chief Treasury Officer.

Certified Correct,  
D. B. FINN,  
Deputy Minister.

## FINANCIAL STATEMENT, DEPARTMENT OF FISHERIES, 1944-45

Vote No.	Appropriation	Amount Authorized	Expenditure
		\$ cts.	\$ cts.
Statutory	Minister's Salary and Car Allowance.....	12,000 00	12,000 00
69 & 479	Departmental Administration.....	159,595 00	149,638 20
70	Salaries and Disbursements of Fishery Officers and Guardians.....	908,700 00	573,007 93
	Fisheries Patrol Service.....		260,570 42
	Fisheries Protection Service.....		23,811 92
71 & 479A	Building Fishways and Clearing Rivers.....	17,000 00	1,071 43
72	Development of the Deep Sea Fisheries and the Demand for Fish.....	30,000 00	19,401 86
73	Fish Culture.....	198,730 00	181,006 43
74	Oyster Culture.....	28,160 00	21,041 83
75 & 480	Fisheries Research Board of Canada.....	368,000 00	338,428 08
76	International Fisheries Commission (Halibut).....	27,100 00	26,898 63
77	International Pacific Salmon Fisheries Commission.....	42,000 00	38,838 32
78	Grant to United Maritime Fisherman's Association.....	3,000 00	3,000 00
79 & 438	Expenses <i>re</i> Pelagic Seal Skins.....	205,000 00	191,458 67
80	Harbour Seal Bounty.....	15,000 00	4,540 00
83	International Pacific Salmon Fisheries Commission (Hell's Gate).....	1,000,000 00	93,155 00
82	Replacement of Gaspé Peninsula Fisheries Experimental Station.....	35,000 00	34,704 12
81	Assistance for construction of plant for the Production of pure Fishery Salt from Malagash Deposits.....	28,000 00	27,385 34
Statutory	Fishing Bounty.....	158,232 10	158,232 10
Statutory	Miscellaneous Civil Service Gratuities.....	980 00	980 00
	Total Ordinary Expenditure.....	3,236,497 10	2,159,170 28
	SPECIAL EXPENDITURE		
482	Improvements of Shore Facilities for Handling of Fisheries Products.....	250,000 00	.....
483	Administrative Expenses of the Fisheries Prices Support Act, 1944.....	20,000 00	.....
84 & 481	Extension of Educational Work in Co-Operative Producing and Selling among the Fishermen.....	56,000 00	54,033 60
	Total Special Expenditure.....	326,000 00	54,033 60
	SPECIAL WAR EXPENDITURE		
Statutory	War Appropriation Act, 1944—		
	Purchase of Fish for Greek Government.....	172,500 00	172,409 93
	Construction of Fishermen's Floats, Prince Rupert, B.C.....	80,000 00	2,607 16
	Subsidy <i>re</i> Fishing Vessels Construction in B.C.....	140,000 00	115,758 22
	Operation of Experimental Vessel, East Coast.....	50,000 00	35,986 64
	Subsidy <i>re</i> Fishing Vessels Construction, East Coast.....	100,000 00	33,408 75
	War Risk Compensation.....	8,000 00	137 00
	Expenses <i>re</i> Supply of Frozen Fish British Ministry of Food.....	15,000 00	12,374 00
	War Bonus to Crews of Fisheries Vessels.....	20,000 00	16,690 68
	Salt Fish Export Regulations Administration.....	18,000 00	17,927 33
	Total Special War.....	603,500 00	407,299 71
(a)	Pacific Halibut Treaty, Special Account (Finance Department).....	\$	21,826 72
	Pacific Salmon Treaty, Special Account (Finance Department).....		34,505 50
	Pacific Salmon Treaty, (Hell's Gate) Special Account (Finance Department).....		73,529 94
	Province of British Columbia (Fisheries Research Board) Special Account (Finance Department).....		343 30
(b)	British Ministry of Food—Herring.....		341 95
	Atlantic Herring Investigation.....		21,181 66

(c) { Mutual Aid—Salmon.....	\$ 9,591,698 55
Mutual Aid—Herring.....	7,373,979 65
Mutual Aid—Frozen Fish.....	3,901,050 99
Mutual Aid—Lobster Tomalley.....	91,417 50
Mutual Aid—Salted Fish.....	210,175 25
Grand Total.....	<u>\$ 23,940,554 60</u>

(a) Balances due by the United States and the Province of British Columbia at the close of the Fiscal Year, 1944-45 on account of Divisible Expenditures.

(b) Purchases of Salmon, Herring and Frozen Fish by the British Government through credit arrangements with the Bank of Canada.

(c) Purchases of Salmon, Herring, Frozen Fish, Lobster Tomalley and Salted Fish through the Mutual Aid Board for Allocation to the United Nations.

Certified Correct,  
F. O. WEEKS,  
*Chief Treasury Officer.*

Certified Correct,  
D. B. FINN,  
*Deputy Minister.*

### Salaries and Disbursements of Fishery Officers and Guardians

#### EXPENDITURE AND SUMMARY 1944-45

NOVA SCOTIA—	
General.....	\$ 1,215 40
Head Office.....	24,355 85
District No. 1.....	42,654 01
District No. 2.....	58,793 95
District No. 3.....	60,769 62
	<u>\$ 187,788 83</u>
PRINCE EDWARD ISLAND—	
General.....	\$ 314 25
District No. 1.....	37,048 34
	<u>37,362 59</u>
NEW BRUNSWICK—	
General.....	\$ 1,108 78
District No. 1.....	25,792 27
District No. 2.....	61,412 61
District No. 3.....	36,118 87
	<u>124,432 53</u>
CANNED FISH INSPECTION OFFICE—EAST COAST.....	12,612 39
FISH CURING INSTRUCTION.....	15,900 88
GENERAL EAST.....	8,817 74
MANITOBA—	
Prairie Provinces Administration.....	6,290 65
BRITISH COLUMBIA—	
Head Office.....	\$ 27,956 98
District No. 1.....	34,457 11
District No. 2.....	47,825 25
District No. 3.....	49,615 41
Canned Fish Inspection Office, West Coast.....	14,217 76
	<u>174,072 51</u>
GENERAL WEST.....	5,729 81
	<u>\$ 573,007 93</u>

#### SUMMARY

Nova Scotia.....	\$ 208,389 39
Prince Edward Island.....	40,791 19
New Brunswick.....	137,734 38
Quebec.....	
Manitoba.....	6,290 65
British Columbia.....	179,802 32
	<u>\$ 573,007 93</u>

## DEPARTMENT OF FISHERIES

*Fisheries Patrol Service*

## EXPENDITURE AND SUMMARY 1944-45

## NOVA SCOTIA—

## District No. 1

Chartered Boats.....	\$ 1,000 81		
		\$	1,000 81

## District No. 2

Departmental Boats.....	\$ 9,164 82		
Chartered Boats.....	517 27		
			9,682 09

## District No. 3

Departmental Boats.....	\$ 14,099 42		
Chartered Boats.....	1,080 00		
			15,179 42
		\$	25,862 32

## PRINCE EDWARD ISLAND—

Departmental Boats.....	\$ 3,997 73		
Chartered Boats.....	6,643 18		
			10,640 91

## NEW BRUNSWICK—

## District No. 1

Departmental Boats.....	\$ 26,403 75		
Chartered Boats.....	363 26		
		\$	26,767 01

## District No. 2

Chartered Boats.....	15,932 15		
			42,699 16

## EAST COAST—GENERAL

1,515 55

## BRITISH COLUMBIA—

## District No. 1

Departmental Boats.....	\$ 25,365 09		
		\$	25,365 09

## District No. 2

Departmental Boats.....	\$ 48,946 48		
Speed Boats.....	13 64		
Chartered Boats.....	42,867 70		
			91,827 82

## District No. 3

Departmental Boats.....	\$ 25,548 28		
Chartered Boats.....	28,489 51		
			54,037 79

Digby Island Warehouse.....	\$ 4,592 63		
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New Westminster Warehouse.....	3,800 10		
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General.....	229 05		
			8,621 78
			179,852 48

\$ 260,570 42

## SUMMARY

Nova Scotia.....	\$ 26,354 38
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Prince Edward Island.....	10,837 73
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New Brunswick.....	43,525 83
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British Columbia.....	179,852 48
	\$ 260,570 42

*Fisheries Protection Service*

## EXPENDITURE SUMMARY 1944-45

West Coast.....	\$ 23,811 92
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*Development of the Deep Sea Fisheries and the Demand for Fish*

## EXPENDITURE 1944-45

Aids in expanding demands for Fish.....	\$ 8,037 68
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Miscellaneous.....	2,080 16
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Subsidy for bait Freezers.....	4,100 00
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Fisheries Intelligence Bureau.....	914 55
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Advertising.....	4,137 30
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Destruction of Sea Lions.....	132 17
	\$ 19,401 86



## Fisheries Research Board of Canada

EXPENDITURE 1944-45

	Expenditures		
	From vote	From receipts	Total
	\$ cts.	\$ cts.	\$ cts.
Atlantic Biological Station—St. Andrews, N.B.....	70,820 65		70,820 65
Atlantic Experimental Station—Halifax, N.S.....	55,688 94		55,688 94
Gaspe Experimental Station—Grand River, P.Q.....	20,158 62	500 00	20,658 62
Herring Investigation, Atlantic.....	4,237 51		4,237 51
Central Fisheries Research Station.....	9,744 03		9,744 03
North West Territories Investigation.....	19,037 27		19,037 27
Pacific Biological Station—Nanaimo, B.C.....	88,041 53	9,214 00	97,255 53
Pacific Experimental Station—Vancouver, B.C.....	45,242 50		45,242 50
Administration and General—			
Toronto Office (A. G. Huntsman).....	10,108 05		10,108 05
Atlantic Salmon Investigations.....	5,585 65		5,585 65
Travelling Expenses.....	6,452 15		6,452 15
Publications.....	1,313 66		1,313 66
Miscellaneous.....	1,997 52	1,014 10	3,011 62
	338,428 08	10,728 10	349,156 18

## STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR 1944-45 FOR CANNED SALMON PURCHASED FOR THE BRITISH MINISTRY OF FOOD

Grade	Size	No. of cans per case	Number of cases	Rate per case
				\$ cts.
<i>Balance paid on 1942 Pack (over-delivery)—</i>				
A-2.....	1 lb.	48	2	11 50
A-3.....	1 lb.	48	10	6 25
			12	

*Expenditure for above*

For fish.....	\$ 85 50
For affixing labels.....	60
For freight.....	6 08

Total Expenditure 1942 Pack.....\$ 92 18

Grade	Size	No. of cans per case	Number of cases	Rate per case
				\$ cts.
<i>Payments on 1943 Pack—</i>				
A-1.....	$\frac{1}{2}$ lb.	96	5,093	17 50
	$\frac{1}{4}$ lb.	96	857	10 50
	1 lb.	48	187	16 25
A-2.....	$\frac{1}{2}$ lb.	96	7,754	12 75
	$\frac{1}{4}$ lb.	96	3,955	8 12 $\frac{1}{2}$
	1 lb.	48	2,378	11 50
A-3.....	$\frac{1}{2}$ lb.	96	26,527	7 50
	$\frac{1}{4}$ lb.	96	445	5 00
	1 lb.	48	29,941	6 25
B-1.....	$\frac{1}{2}$ lb.	96	298	14 00
	$\frac{1}{4}$ lb.	96	Cr. 46	8 75
B-2.....	$\frac{1}{2}$ lb.	96	332	11 25
	1 lb.	48	Cr. 4	10 00
B-3.....	$\frac{1}{2}$ lb.	96	1,364	6 75
	$\frac{1}{4}$ lb.	96	136	4 62 $\frac{1}{2}$
	1 lb.	48	Cr. 965	5 50
			78,252	

(Equivalent in full cases—48 lbs. per case—75-578 $\frac{1}{2}$ )

Expenditure made for fish as above, plus 5% balances on shipments made from storage and on which 95% payment was made in 1943-44. ....	\$ 757,861 83
Payments to Packers for affixing labels. ....	5,786 56
Printing of labels. ....	1,181 87
Rail freight. ....	120,492 15
Ocean freight. ....	4,812 97
Carrying charges @ 2% to cover storage and Insurance. ....	21,597 58
Interest charges @ 5% on payments delayed over 30 days. ....	444 73
Miscellaneous. ....	577 57
Total expenditure 1943 Pack. ....	\$ 912,755 26

STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR  
1944-45 FOR CANNED SALMON PURCHASED FOR THE BRITISH MINISTRY OF FOOD

Grade	Size	No. of cans per case	Number of cases	Rate per case
				\$ cts.
<i>Payments on 1944 Pack—</i>				
A-1. ....	$\frac{1}{2}$ lb.	96	113,309	17 50
	$\frac{1}{4}$ lb.	96	143,122	10 50
	1 lb.	48	36 $\frac{1}{2}$	16 25
A-2. ....	$\frac{1}{2}$ lb.	96	78,758	12 75
	$\frac{1}{4}$ lb.	96	35,807	8 12 $\frac{1}{2}$
	1 lb.	48	4,833	11 50
A-3. ....	$\frac{1}{2}$ lb.	96	243,327	7 50
	$\frac{1}{4}$ lb.	96	17,753	5 00
	1 lb.	48	236,472	6 25
B-1. ....	$\frac{1}{2}$ lb.	96	5,474	14 00
	$\frac{1}{4}$ lb.	96	401	8 75
	1 lb.	48	85	12 75
B-2. ....	$\frac{1}{2}$ lb.	96	1,827	11 25
B-3. ....	$\frac{1}{2}$ lb.	96	2,185	6 75
	$\frac{1}{4}$ lb.	96	113	4 62 $\frac{1}{2}$
	1 lb.	48	2,463	5 50
			885,965 $\frac{1}{2}$	

(Equivalent in full cases—48 lbs. per case 787,367 $\frac{1}{2}$ )

*Expenditure for 1944 Pack—*

For fish as above. ....	\$ 8,356,651 57
Payment to cannery for affixing labels and in some cases, supplying same	88,271 85
Rail freight. ....	218,240 50
Carrying charges @ 2% for storage and insurance. ....	119 69
Interest charges @ 5% on payments delayed over 30 days. ....	602 49
Miscellaneous (Strapping charges, extra marking, pro-coating etc.) ....	14,965 01
Total expenditure on 1944 Pack. ....	\$ 8,678,851 11
Total. ....	\$ 9,591,698 55

*Funds for above furnished as follows:—*

By the Canadian Mutual Aid Board:	
Mutual Aid Appropriation. ....	\$ 193,836 68
United Kingdom cash receipts account. ....	9,397,861 87
	\$ 9,591,698 55

## STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR 1944-45 FOR CANNED SALMON PURCHASED FOR THE BRITISH MINISTRY OF FOOD

During the fiscal year 1944-45, the following quantities of canned salmon were released from the Ministry's stock in storage for shipment to the British Colonies or for the Department of Munitions and Supply and refunds of the value of same were received and credited to the Ministry's account.

Destination	No. of full cases 48 lbs. per case	Refund received
1943 Pack—West Indies.....	13,674½	\$ 83,480 80
Dept. of Munitions and Supply.....	3,235	29,131 99
1944 Pack—Dept. of Munitions and Supply.....	6,015	60,289 16
Australia.....	600	6,930 00
Trinidad.....	2,400	15,120 00
	25,924½	194,951 95

## STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR 1944-45 FOR CANNED HERRING PURCHASED FOR THE BRITISH MINISTRY OF FOOD

## EAST COAST—

## 1943-44 Pack—

Payment for 6,333 cases sardines (100-¼ lb. cans per case) at \$5.00 a case.....	\$ 31,665 00	
Refund received for a short delivery of 16 cases herring (48-½ lb. oval cans per case) at \$4.30 a case.....	68 80	
Net expenditure for fish.....	\$ 31,596 20	
Expenditure for freight, etc.....	1,223 26	
	\$ 32,819 46	

## 1944-45 Pack—

Type of Container	Size	No. of cans per case	No. of cases	Rate per case	
Ovals (in T.S.)....	1 lb.	48	14,262	\$ 6 00	
Ovals (in T.S.)....	½ lb.	48	11,533	4 50	
Ovals (in Oil).....	1 lb.	48	1,075	6 50	
Ovals (in Oil).....	½ lb.	48	1,084	4 75	
			27,954		
(Equivalent in full cases—48 lbs. per case—21,645½)					
Payments for fish.....				\$ 149,607 00	
Freight, etc.....				3,444 55	153,051 55
Total expenditure—East Coast.....					\$ 185,871 01

## WEST COAST—

## 1942-43 Pack—

5% Balance on fish shipped from storage.....	\$ 51 12	
Payment for 68 cases (48-1 lb. ovals per case) @ \$4.80 a case.....	326 40	
Freight.....	792 05	
Carrying charges @ 4% for storage and insurance.....	55 65	
Total expenditure on 1942-43 Pack.....	\$ 1,225 22	

## 1943-44 Pack—

Type of Container	Size	No. of cans per case	No. of cases	Rate per case	
Ovals.....	1 lb.	48	222,613	\$ 4 80	
Ovals.....	½ lb.	48	43,627	3 95	
Talls.....	1 lb.	48	74,001	4 22	
Total number of cases.....			340,241		
(Equivalent in full cases—48 lbs. per case—318,427½)					

Expenditure for fish, including 5% balance on goods shipped from storage, 95% having been paid in the fiscal year 1943-44.....		\$ 1,628,706 30
Rail freight.....		127,174 43
Ocean freight.....		350,448 00
Carrying charges @ 4% for storage and insurance.....		29,009 79
Miscellaneous (strapping charges, cartage, etc.).....		3,852 03

Total expenditure on 1943-44 Pack.....\$ 2,139,190 55

1944-45 Pack—

Type of Container	Size	No. of cans per case	No. of cases	Rate per case
Ovals.....	1 lb.	48	842,299	\$ 4 80
Ovals.....	$\frac{1}{2}$ lb.	48	106,021	3 95
Talls.....	1 lb.	48	87,016	4 22

Total number of cases.....1,035,336

(Equivalent in full cases—48 cans per case—982,325 $\frac{1}{2}$ )

Expenditure for fish.....	\$ 4,827,570 22
Rail freight.....	44,412 13
Ocean freight.....	162,591 02
Tomato sauce supplied by Packers.....	10,437 00
Miscellaneous (strapping charges, marking etc.).....	3,024 45

Total expenditure—West Coast.....\$ 5,048,034 82

Total expenditure—West Coast.....\$ 7,188,450 59

Total expenditure—East and West Coasts.....\$ 7,374,321 60

Funds for the above furnished as follows:—

By the British Ministry through the Bank of Canada.....	\$ 341 95
By the Canadian Mutual Aid Board.....	1,653,212 93
Mutual Aid Appropriation.....	5,720,766 72
	<u>\$ 7,374,321 60</u>

During the fiscal year 1944-45, 21,542 cases of canned herring, (1 lb. tall cans) were released from the Ministry's stock in storage for shipment to the British West Indies. A refund of the value—\$83,292.16—was received and credited to the Ministry's account.



# REPORT OF THE DEPUTY MINISTER

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## EXPENDITURE MADE IN THE FISCAL YEAR 1944-45 FOR FROZEN FISH PURCHASED FOR THE BRITISH MINISTRY OF FOOD

Kind of Fish	Quantity	Rate per lb.		
<b>WEST COAST—</b>				
Flat Fish.....	16,109 35	7½¢		
Halibut.....	11,250 67	21½¢		
Halibut.....	3,389 75	19½¢		
	30,749 77			
<i>Expenditure—</i>				
For fish.....			\$ 425,996 98	
For freight, icing charges, etc.....			95,349 86	
				\$ 521,346 84
<b>EAST COAST—</b>				
<i>Nova Scotia—</i>				
Flat Fish.....	7,858 00	7½		
Cod.....	78,615 70	17½		
Cod.....	25,473 90	17		
Cod.....	6,267 15	16½		
Pollock.....	6,085 50	12½		
Pollock.....	6,183 90	12		
Pollock.....	523 95	11½		
	131,008 10			
<i>Expenditure—</i>				
For fish.....			\$2,127,765 17	
For freight, icing charges, etc.....			33,833 60	
				2,161,598 77
<b>NEW BRUNSWICK—</b>				
Flat fish.....	1,237 25	7½		
Cod.....	5,659 60	17½		
	6,896 85			
<i>Expenditure—</i>				
For fish.....			\$ 108,322 36	
For freight, icing charges, etc.....			4,405 30	
				112,727 66
<b>Quebec—</b>				
Flat fish.....	1,238 53	7½		
Cod.....	54,134 30	17½		
Cod.....	3,957 00	17		
	59,329 83			
<i>Expenditure—</i>				
For fish.....			\$1,023,901 94	
For freight, icing charges, etc.....			37,526 28	
				1,061,428 22
<b>East General—</b>				
Expenditure for storage, Misc. Transport- ation, costs, etc.....				43,949 50
				\$ 3,901,050 99

### Totals—

Total quantities—West Coast.....	3,074,977 lbs.
—East Coast.....	19,723,478 lbs.
	22,798,455 lbs.

### Total Expenditures—

For fish—West Coast.....	\$ 425,996 98
—East Coast.....	3,259,989 47
	\$ 3,685,986 45
For Freight, etc.—West Coast.....	\$ 95,349 86
—East Coast.....	119,714 68
	215,064 54

\$ 3,901,050 99

Funds for the above were furnished by the

Canadian Mutual Aid Board:—	
From Mutual Aid Appropriation.....	\$ 1,329,445 65
From United Kingdom Cash Receipts Account.....	2,571,605 34

\$ 3,901,050 99

*Salted Fish*EXPENDITURE MADE IN FISCAL YEAR 1944-45 FOR SALTED FISH PURCHASED BY THE  
BRITISH MINISTRY OF FOOD

Quality	Quantity in Lbs.		Price Paid per 100 Lbs.	
NEW BRUNSWICK—				
<i>Green Salted Cod—</i>				
Fancy—Extra Large.....	13,950		11 00	
Fancy—Large.....	13,050		11 00	
Fancy—Medium.....	33,600		9 55	
	78,600			
<i>Pickled Cod Fillets—</i>				
Large.....	15,750		15 70	
Medium.....	10,200		14 75	
Small.....	2,700		13 80	
	28,650			
Total Quantity.....		107,250 lbs.		
<i>Expenditure—</i>				
For fish.....			12,508 63	
Packaging at 1.50 per box of 100 lbs. and over.....			1,072 50	
Transportation costs.....			379 47	
				\$ \$13,960 60
NOVA SCOTIA—				
<i>Green Salted Cod—</i>				
Fancy—Extra Large.....	33,100		11 00	
Fancy—Large.....	60,750		11 00	
Fancy—Medium.....	54,500		9 55	
Fancy—Small.....	56,000		8 30	
Choice—Extra Large.....	62,990		9 40	
Choice—Large.....	249,500		9 40	
Choice—Medium.....	74,200		8 10	
Choice—Small.....	95,750		6 80	
	686,790			
<i>Pickled Cod Fillets—</i>				
Large.....	9,650		15 70	
Medium.....	17,450		14 75	
Small.....	6,250		13 80	
	33,350			
Total quantity.....		720,140 lbs.		
<i>Expenditure—</i>				
For fish.....			67,022 94	
Packaging @ 1.50 per box of 100 lbs. and over.....			9,598 50	
Transportation costs.....			2,331 01	
				\$ \$78,952 45

EXPENDITURE MADE IN FISCAL YEAR 1944-45 FOR SALTED FISH PURCHASED BY  
THE BRITISH MINISTRY OF FOOD

Quality	Quantity in Lbs.	Price Paid per 100 lbs.
<b>QUEBEC—</b>		
<i>Green Salted Cod—</i>		
Fancy—Extra Large.....	179,400	11 00
Fancy—Large.....	253,350	11 00
Fancy—Medium.....	87,900	9 55
Fancy—Small.....	22,150	8 30
Choice—Extra Large.....	33,450	9 40
Choice—Large.....	101,950	9 40
Choice—Medium.....	90,600	8 10
Choice—Small.....	86,100	6 80
	854,900	
<i>Pickled Cod Fillets—</i>		
Large.....	84,030	15 70
Medium.....	14,550	14 75
Small.....	11,700	13 80
	110,280	
Total quantity.....	965,180 lbs.	
<i>Expenditure—</i>		
For fish.....		100,709 85
Packaging @ 1.50 per box of 100 lbs. and over.....		9,757 80
Transportation costs.....		4,891 22
		\$115,358 87
<i>East General—</i>		
Storage and Misc. costs paid by National Harbours Board.....		1,903 33
<b>SUMMARY</b>		
<i>Total quantities—</i>		
Green Salted Cod.....	1,620,290 lbs.	
Pickled Cod Fillets.....	172,280 lbs.	
	1,792,570 lbs.	
<i>Total expenditure—</i>		
For fish.....		180,241 42
Packaging.....		20,428 80
Transportation and misc. costs.....		9,505 03
		\$210,175 25
Funds for the above were provided by the Canadian Mutual Aid Board:—		
From U.K. Cash Receipts Acct.....	201,724 98	
From Mutual Aid Appropriation.....	8,450 27	
	\$210,175 25	

EXPENDITURE MADE IN THE FISCAL YEAR 1944-45 FOR LOBSTER TOMALLEY  
PURCHASED BY THE BRITISH MINISTRY OF FOOD

## EAST COAST—

Number of cases (96—6 oz. cans per case).....	3,585
Price paid per case—\$25.50 f.o.b. Halifax.....	
Total payments made.....	\$91,417 50
Funds provided by the Canadian Mutual Air Board from U.K. Cash receipts account.....	

## DEPARTMENT OF FISHERIES

## FISHERIES EXPENDITURE 1944-45 BY PROVINCES

Appropriation	General	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	British Columbia	Northwest Territories	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Salaries and Disbursements, Fishery Officers and Guardians		208,389 39	40,701 19	127,734 38			6,219 65	179,402 32		573,007 93
Fisheries Patrol Service		26,354 38	10,837 73	43,626 83				179,852 48		290,570 42
Fisheries Protection Service								23,811 92		23,811 92
Development of the Deep Sea Fisheries and the Demand for fish		165 61		54 84				850 98		1,071 43
Fish Culture	7,885 56	96 00	100 00	4,050 00	3,794 89	1,569 84		1,905 57		19,401 88
Oyster Culture	13,320 16	97,729 16	8,768 99	61,178 12				181,006 43		181,006 43
Fisheries Research Board of Canada	914 69	6,494 34	12,992 95	61,639 85				21,041 83		21,041 83
International Fisheries Commission (Halifax)					20,158 62		9,744 63	134,384 91	19,037 27	338,428 08
International Pacific Salmon Fisheries Comm.								26,808 63		26,808 63
Grant to United Maritime Fishermen Association		57,619 60	7,250 58	65,402 59				38,838 32		38,838 32
Expenses re Pelagic Seal Skins										3,000 00
Halibut Seal Bounty	191,458 67	1,000 00	1,000 00	1,000 00				2,402 50		191,458 67
International Pacific Salmon Fisheries Commission (Hell's Gate)		1,597 50	112 50	427 50						4,540 00
Replacement of Caspe Peninsula Fisheries Experimental Station								93,155 00		93,155 00
Assistance for Construction of Plant for the Production of Pure Fishery Salt from Malagash Deposits					34,704 12					34,704 12
Fishing Bounty (a)		27,385 34								27,385 34
Extension of Educational Work in Co-operative Producing and Selling Among Fishermen		76,015 80	9,565 15	21,330 25	51,311 50					158,252 10
War Appropriation Act, 1944—		21,705 78	5,240 30	10,617 33	12,000 00			4,470 19		54,033 60
Purchase of Fish for Greek Government										
Construction of Fisherman's Floats, Prince Rupert, B.C.		106,888 40	20,354 37		45,167 16					172,409 93
Subsidy to Fishing Vessels Construction in B.C.								2,697 16		2,697 16
Operation of Experimental Vessel—East Coast		35,986 64						115,758 22		115,758 22
Subsidy to Fishing Vessels Construction—East Coast								33,360 44		33,360 44
War Risk Compensation								33,408 75		33,408 75
Expenses re Supply of Frozen Fish—British Ministry of Food					137 00					137 00
War Risk Bonus to Crews of Fisheries Vessels		10,190 68		2,183 32						12,374 00
Salt Fish Export Regulations—Administration		1,671 73	231 23	1,337 14				13,150 58		16,090 68
Departmental Administration	968 72	11,588 54	1,419 68	1,419 08	2,534 91					17,097 33
Minister of Fisheries	149,638 20									149,638 20
Solary and Car Allowance	12,000 00									12,000 00
Miscellaneous Civil Service Gratuities	980 00									980 00
Special Accounts—Finance Dept.										
(a) Halibut Treaty										
(a) Salmon Treaty								21,826 72		21,826 72
(a) Salmon Treaty (Hell's Gate)								34,505 50		34,505 50
(b) Province of British Columbia Fisheries Research Board								73,529 94		73,529 94
Herring and Pilehead Investigation								267 14		267 14
Shell Fish Investigation								76 16		76 16
(c) British Ministry of Food—Herring				341 95						341 95



Atlantic Herring Investigation		8,472 67	4,236 34	1,059 08	3,177 24	4,236 33				21,181 65
Dept. of Fisheries:—										
(a) Mutual Aid	Salmon									
(a) Mutual Aid	Herring									
(a) Mutual Aid	Frozen Fish									193,836 68
(a) Mutual Aid	Salt Fish		785,696 28							1,653,212 93
(a) Mutual Aid	(U.K. Cash)		8,450 21							1,329,445 65
(a) Mutual Aid	(U.K. Cash) Salmon				38,592 70	310,673 35				8,450 27
(a) Mutual Aid	(U.K. Cash) Herring									9,397,861 87
(a) Mutual Aid	(U.K. Cash) Frozen Fish		1,415,760 54		185,941 10					5,534,825 62
(a) Mutual Aid	(U.K. Cash) Lobster Tomally		8,593 50	56,890 50	25,933 50	750,754 87				2,571,605 34
(a) Mutual Aid	(U.K. Cash) Salted Fish		72,107 44		14,298 67	115,358 87				91,417 50
Totals		410,869 12	2,986,033 26	176,613 65	730,389 55	1,350,829 02	1,569 84	16,034 68	18,249,178 21	23,940,554 60
										19,037 27

NOTE.—(a) Balance due by the United States Government on divisible expenses incurred during the Fiscal Year 1944-45.  
 (b) Balance due by the Province of British Columbia on divisible expenses incurred during the Fiscal Year 1944-45.  
 (c) Purchases of Fish by the British Government through credit arrangements with the Bank of Canada.  
 (d) Purchases of Fish through the Mutual Aid Board for allocation to the United Nations and friendly neutral countries.

## EXPENDITURES BY THE DOMINION GOVERNMENT ON ACCOUNT OF FISHERIES SERVICE SINCE CONFEDERATION

—	Fish Inspection etc.	Fish Culture	Fisheries Research Board	Dev. D. S. Fish, etc.	Fishing Bounty	Sundry Services	Total
To 1940-41 (a)	34,442,683 45	11,388,022 90	3,933,601 99	2,382,254 64	9,348,621 07	10,356,689 88	71,851,873 93
1941-42	750,996 22	175,952 43	221,458 93	29,427 68	159,959 60	475,691 95	1,813,486 81
1942-43	763,945 71	181,027 36	217,040 76	30,381 14	159,930 60	563,589 29	1,915,914 86
1943-44	796,944 38	170,633 67	225,473 61	29,426 29	159,400 80	21,338,879 17	22,720,757 92
1944-45	857,390 27	181,006 43	338,428 08	19,401 86	158,232 10	22,356,095 86	23,940,554 60
	37,611,960 03	12,096,642 79	4,936,003 37	2,490,891 61	9,986,144 17	55,120,946 15	122,242,588 12

(a) For details by fiscal years see Appendix No. 6 of the Departmental Report for 1940-41.

## SUMMARY BY PROVINCES

	Total
General	\$ 7,074,792 56
Nova Scotia	24,958,169 15
Prince Edward Island	3,890,848 82
New Brunswick	12,002,999 06
Quebec	7,727,568 06
Ontario	4,211,103 22
Manitoba	1,832,549 64
Manitoba and Northwest Territories	24,771 76
Northwest Territories	90,279 45
Saskatchewan	580,086 15
Alberta	641,689 70
British Columbia	59,178,372 12
Yukon	29,358 43
Total	\$ 122,242,588 12

## REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE CONFEDERATION

—	Fisheries Revenue and Fines and Forfeitures	Casual Revenue	Pelagic Sealing Revenue	Sundry Revenue	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
To 1940-41 (a)	5,787,534 83	247,622 11	1,757,411 34	5,149,693 32	12,942,261 60
1941-42	80,299 57	9,897 20	325,131 12	40,403 57	455,731 46
1942-43	82,906 87	7,717 42	212,131 45	17,276 70	320,032 34
1943-44	80,333 20	5,091 68	219,260 71	735 07	305,420 66
1944-45	73,265 92	5,955 35	374,743 20	25,701 15	479,665 62
	6,104,340 39	276,283 76	2,888,677 72	5,233,809 81	14,503,111 68

(a) For details by fiscal years see Appendix No. 6 of the Departmental Report for 1940-41.

## SUMMARY BY PROVINCES

General	7,727,031 98
Nova Scotia	859,055 10
Prince Edward Island	207,553 01
New Brunswick	749,313 31
Quebec	359,096 29
Ontario	561,139 94
Manitoba	335,474 05
Manitoba and Northwest Territories	7,416 45
Northwest Territories	9,533 23
Hudson Bay District	1,192 88
Saskatchewan	95,152 41
Alberta	234,710 87
British Columbia	3,337,183 38
Yukon	19,258 75
Total	\$ 14,503,111 68

DOMINION OF CANADA

SIXTEENTH  
ANNUAL REPORT

OF THE

DEPARTMENT OF FISHERIES

SEVENTY-NINTH ANNUAL FISHERIES REPORT  
OF THE DOMINION

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FOR THE YEAR

1945-46



OTTAWA  
EDMOND CLOUTIER, C.M.G., B.A., L.Ph.,  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
CONTROLLER OF STATIONERY

1947





*To His Excellency Field Marshal the Right Honourable Viscount Alexander of  
Tunis, G.C.B., G.C.M.G., C.S.I., D.S.O., M.C., LL.D., A.D.C., Governor  
General and Commander-in-Chief of the Dominion of Canada*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour herewith, for the information of Your Excellency and the Parliament of Canada, to present the Sixteenth Annual Report of the Department of Fisheries, being the Seventy-ninth Annual Fisheries Report for the Dominion.

I have the honour to be,

Your Excellency's most obedient servant,

H. FRANCIS G. BRIDGES,  
*Minister of Fisheries.*

DEPARTMENT OF FISHERIES;  
Ottawa, October 1, 1946.



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## REPORT OF THE DEPUTY MINISTER

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To the Hon. H. FRANCIS G. BRIDGES, M.P.,  
Minister of Fisheries.

SIR,—Herewith I have the honour to submit the Sixteenth Annual Report of the Department of Fisheries, which is the Seventy-ninth Annual Report on the fisheries of Canada and covers the fiscal year 1945-46.

Included in the report are the following appendices:—

Reports of the Chief Supervisors of Fisheries

Report on Fish Culture

Report of the Fisheries Engineer

Report on Oyster Culture and the Further Development of Oyster Farming

Reports on the Operations of the Fish Inspection Laboratories, Atlantic and Pacific

Financial Report of the Department.

### PRODUCTION AND EXPORT BUSINESS

New high levels were reached in 1945 both in the value of Canada's fisheries production and the value of the products shipped abroad by the fishing industry. The catch was valued at more than \$105,000,000 on the market, as against something over \$89,400,000 in 1944, which itself had been a record making year. Fisheries products exported in 1945 were worth slightly more than \$84,800,000, a total which represented an increase of \$16,100,000 and more over the foreign trade done by the industry in the preceding year, and the 1944 total, too, had been well above the highest previous mark. The large 1945 figures reflect, of course, a continuation of peak demand for fish products, and the firm prices, which war-made conditions had created.

This review does not purport to set out complete and detailed figures as to production for the past year. Annual fisheries statistics are prepared by the Dominion Bureau of Statistics and the Department of Fisheries, jointly, with the co-operation of provincial fisheries services in those parts of the country where the fisheries are under the administration of the provinces. Collection and revision and compilation of detailed data relating to all of the country's many commercial fisheries is never a brief task—a very large number of statistical schedules have to be dealt with—and it happens that at the moment of writing there are still some gaps in the 1945 record. In those circumstances no complete review of the results of the year's fishing and processing operations is possible. Full details of those results will be recorded in the annual printed statistical report, *Fisheries Statistics of Canada, 1945*.

However, it is at least to be said here that there was upward trend in dollar return from the fisheries generally in 1945. Here and there, of course, there was an exception to the rule but the exceptions had the customary effect of emphasizing the general condition. In all the provinces save one, Saskatchewan, the year's marketed value total was greater than it had been in 1944, and the one decrease was comparatively small. Sea fisheries and freshwater fisheries

alike brought in more dollars than in the preceding year, though the former, being on a much greater scale than the others, naturally contributed the far larger part of the aggregate gain.

British Columbia's salmon fishery, first among all of Canada's commercial fisheries in point of annual marketed value of production, yielded a much larger catch than in the year before, though perhaps it should be noted that, for some inexplicable reason, the 1944 run of Pacific salmon had been below average size. Canned salmon pack in the province was not far short of 1,740,000 cases, as compared with slightly less than 1,100,000 cases in the preceding season. All told, the British Columbia salmon landings were worth more than \$25,400,000 on the market. The herring and halibut fisheries, next to the salmon fishery in importance in British Columbia, also showed increases in catches and in marketed value.

On the Atlantic coast such major fisheries as the cod and lobster fisheries had increased catches to their credit, and increased value of production. The cod fishermen, in particular, did well as regards gain in production volume but their fishery, of course, permits a greater intensification of fishing effort than could wisely be applied to the more limited lobster stocks. As a matter of fact, not only did the lobster and cod fisheries produce bigger catches but the catch figures were also satisfactory in most of the other Atlantic fisheries. The sardine fishery, however, a fishery of a considerable importance, was among the exceptions. The year's sardine landings, nearly all of them made in southwestern New Brunswick, fell off quite sharply, and there was an accompanying decrease on the money side of roughly \$500,000.

In the freshwater areas of the country the whitefish is the normal leader among the commercial fish, both as regards aggregate volume and aggregate value of catch. In 1945, however, the nets did not take as large a quantity of whitefish as in 1944—something like 16,650,000 pounds as against 17,700,000. Nevertheless, catch decrease was offset by increased firmness of price and the whitefish were worth, all told, approximately \$4,000,000 which meant a gain of \$500,000. Incidentally, lessened whitefish landings in Saskatchewan explain the net decrease which occurred in the over-all marketed value return from the year's fishing operations in that province. The Saskatchewan fishermen again took more whitefish than the fishermen of any other province—the Manitoba men were second—but they had to be content with less satisfactory results than they had obtained in 1944.

*Export Trade:* Making up the export total for the year, \$84,800,000, were shipments to the United States to the amount of \$53,057,000, to the United Kingdom \$13,795,000, and to other parts of the world \$17,948,000. (Round numbers have been used in all cases). By classifications of products the business was divided into \$44,232,000 worth of fresh and frozen fish, canned fish to the amount of \$23,865,000, cured fish (dried, pickled, smoked) valued at \$11,790,000, oils totalling \$4,575,000, and miscellaneous other products amounting to \$337,000.

There was dollar decrease in the exportation to the United Kingdom, as compared with the figures for 1944, but the drop of over \$5,000,000 in that case was more than offset by a gain which exceeded \$11,300,000 in the sales to the United States and an increase of 100 per cent in the business with remaining export markets. Shipments to these latter areas totalled nearly \$17,950,000, as against less than \$8,700,000 in the preceding year. The reduction in the business with Britain was mainly due to decrease in shipment of canned fish. Considerable quantities of fish put up in the calendar year 1945 will enter into the 1946 export figures.

The year's export business in fresh and frozen fish was mainly done, of course, with the neighbouring United States—\$40,300,000 out of the \$44,232,000 aggregate. Shipment across the border increased by roughly \$12,500,000. There was a small gain in the trade with the United Kingdom. Sales outside of Britain and the United States were small.

In the case of cured fish, too, more than half the business was with the United States, or \$6,014,000. Britain, of course, is never a big buyer of products in this category. Countries other than the United States and Britain received cured fish valued at \$5,700,000 and a little more.

Export value of oils was a couple of hundred thousand dollars below the 1944 level but in the case of canned products there was a substantial betterment, \$2,600,000. As already indicated, the canned fish exportation to Britain showed reduction and so, too, did the business with the United States, though in the latter instance the decrease was not large. On the other hand, canned fish shipments to other countries more than doubled. The figures in this latter case were \$11,400,000, and a little more, in 1945, as compared with \$4,100,000 in 1944. The big gain here was due in large part to the movement of supplies for use in UNRRA's relief-feeding program. Canned salmon (\$11,790,000) and canned herring (\$6,900,000) were the principal items entering into the canned fish side of the exportation account.

#### INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

The International Pacific Salmon Fisheries Commission was created by treaty between Canada and the United States on July 28, 1937, for the purpose of restoring the badly depleted sockeye salmon fishery of the Fraser River system. It was understood before final ratification of the treaty that the Commission should not "promulgate or enforce regulations until the scientific investigations provided for in the convention have been made, covering two cycles of sockeye runs, or eight years". At the end of the 1945 season these eight years of investigations have been completed, and although much research was directed toward finding the best methods of obtaining reliable statistics of the catch and the escapement the main purpose of the Commission was to discover the causes for the decline of the fishery and to determine means whereby the runs to the Fraser River can be rebuilt to their former size.

The Commission met three times during 1945, first in Vancouver, B.C., in April, second at Seattle, Washington, in August, and third in Vancouver, in December. Members of the Commission were: For the United States—Edward W. Allen, Chairman, Fred J. Foster, and Charles E. Jackson: For Canada—A. L. Hager, Vice-Chairman, A. J. Whitmore, Secretary, and Tom Reid, M.P.

An outstanding achievement for the Commission in 1945 was the partial completion of the fishways at Hell's Gate. Although the right bank fishway was finished, only a 20-foot section of a fishway operated on the left bank but the runs of sockeye successfully passed through the fishways with little or no delay. Proof was found in recoveries from tags released below Hell's Gate which showed plainly that there was no accumulation of fish below the gate. Fish were observed after passing through the fishways on their way up-river.

Studies and observations on the spawning ground verified these results. Sockeye salmon arrived in some streams two weeks earlier than had been observed in previous years. The fish were in splendid condition and free from the injuries caused in former years by blockade conditions. Many of the runs on the spawning grounds showed an increase of more than five times the



numbers of fish counted in their brood year. Yet if the fishways at Hell's Gate had not been partially completed in 1945 the water levels were such that a serious block would have developed and heavy loss inflicted on the spawning runs of salmon.

The elimination of the obstruction at Bridge River Rapids, located just above the confluence of Bridge River on the Fraser River proper some six or seven miles north of the town of Lillooet, was the next project to be undertaken by the Commission. Biological and engineering studies have shown that adverse conditions for the passage of salmon exist here below certain water levels. Steps were taken immediately by the Commission to let the contract and to begin work in December on the two fishways—one at each series of falls 900 feet apart on the west (or right) side of the river.

By 1946 the fishways at Hell's Gate and at Bridge River Rapids will be completed and for the first time sockeye salmon will be able to ascend the main Fraser River without difficulty.

Other minor obstructions were considered by the Commission. The Adams River dam, located 475 yards below the outlet of Adams Lake and 55 miles northeast of Kamloops, was originally constructed for the impounding of water to be used to drive logs down river by splashing methods. The dam had ceased to be of use and was in such a state of disrepair that it had become a menace to the migration of sockeye salmon. The Commission was authorized to destroy the structure and removal was completed by December 1, 1945.

From the results of biological studies, an obstruction was found at Farwell Canyon, although not as complete or as serious a blockade as has been found at Hell's Gate or at Bridge River Rapids. An engineering survey was made of this reach of the Chilcotin River and plans were being formulated to overcome the difficult water conditions.

The investigations at Keighley Holes, about 71 miles above Farwell Canyon on the Chilcotin River, and at Skookumchuck Rapids, on the Lillooet River, did not show the existence of blockade conditions at the water levels of 1945.

The release of tagged fish at various points throughout the treaty waters has furnished the basic information for the detection and study of obstructions, in the determination of the times and routes of migration, and in the enumeration of populations in the spawning streams. In 1945 the following tagging experiments were conducted:—

Place	Number of tags
Swiftsure .....	39
Sooke .....	1,425
Skookumchuck .....	1,784
Hell's Gate .....	5,176
Bridge River Rapids .....	2,928
Farwell Canyon .....	2,973
Siwash Bridge .....	179
Keighley Holes .....	67
Soda Creek .....	20
Various spawning areas .....	1,136
	<hr/> 15,727

Statistics of the 1945 run of sockeye salmon were carefully evaluated. From Commission records it is found that the Canadian fishery took 969,444 sockeye while 716,685 were landed from American waters. The total catch of 1,686,129 sockeye was only 36 per cent of the catch made in 1941, the brood year. The catch of the Indian fishery for 1945 totalled 43,959 sockeye, as compared with 52,920 taken in 1941. The total estimated spawning escapement of sockeye to the major streams of the Fraser River watershed was 515,320 fish



as compared with 443,173 recorded in the brood year. From these estimates, the spawning escapement of 1945 increased 116 per cent over the 1941 population and was a decided contrast to the decreased catches found in the commercial and Indian fisheries.

### INTERNATIONAL FISHERIES COMMISSION

During 1945 the International Fisheries Commission continued the regulation of the Pacific halibut fishery, under authority of the treaty of January 29, 1937. It also continued observations of trends in the fishery and investigations of the condition of the stocks of halibut which are essential to rational control of the fishery.

Regulations governing halibut fishing in 1945, approved by the Governor General of Canada and by the President of the United States, became effective on February 24. They were fundamentally the same as those of previous years, though modified in the following respects. The catch limit for Area 2 was increased from 23,500,000 to 24,500,000 pounds and that for Area 3 from 27,500,000 to 28,000,000 pounds, to secure from each area the maximum yield that the improved condition of its stock warranted. On the recommendation of the Conference Board of halibut fishermen and vessel owners, the opening date for the fishing season was changed from April 16 to May 1. A provision of the regulations under which the Commission could set any date between November 1 and November 30 as the beginning of the closed season was eliminated to provide a definite date, midnight of November 30, as the beginning of the statutory closed season. Permits for the retention of halibut caught incidentally by setline boats fishing for other species in areas closed to halibut fishing were made invalid at midnight of November 15, fifteen days earlier than in 1944.

Areas 1 and 2, which include all fishing grounds south of Cape Spencer, Alaska, were closed to halibut fishing at midnight of June 15 when the Area 2 catch limit was attained. The Area 3 catch limit was reached and Areas 3 and 4, which include all grounds north and west of Cape Spencer, Alaska, were closed at midnight of September 24. Limited amounts of incidentally caught halibut were landed under permit until November 15 as provided in the regulations. The fishing season in Area 2, where many additional vessels entered the fishery, was the shortest in the history of the fishery.

The total catch of halibut on the Pacific coast in 1945 amounted to 54,665,000 pounds. Of this, 529,000 pounds were landed from Area 1, south of Willapa Harbor, Washington, 24,980,000 pounds from Area 2, between Willapa Harbor and Cape Spencer, Alaska, and 29,156,000 pounds from Area 3, between Cape Spencer and the Aleutian Islands. No halibut fishing was done in Area 4, which includes the Aleutian Islands region and Bering Sea. The Area 2 catch included 920,000 pounds of halibut landed under permit as the incidental catch of setline vessels fishing for other species after the area was closed to halibut fishing.

The halibut catch of the Canadian fleet in 1945 was 15,301,000 pounds. This was 1,993,000 pounds more than in 1944 and the largest Canadian catch since 1914. Canadian vessels secured 11,750,000 pounds or 47 per cent of the Area 2 total and 3,551,000 pounds or 12 per cent of the Area 3 total. These Canadian shares of the catch totals from Areas 2 and 3 were the highest since regulation of the halibut fishery began.

The Commission continued the scientific investigations upon which regulation of the halibut fishery depends. Current statistical and biological data were collected and analyzed to ascertain the success of past and present regulations and to provide a sound basis for future action. The collection of biological data at sea made vessel operations necessary.

The abundance of halibut as measured by the average catch per standard unit of fishing effort receded in both Areas 2 and 3 from the high levels reached in 1944. The catch per unit of gear fished in Area 2 was about four per cent below the level of 1944 and intermediate between the levels of 1943 and 1944. In Area 3, the catch per unit fell 12 per cent, to approximately the level of 1942 and 1943. However, the levels of abundance in Areas 2 and 3 were still 131 and 104 per cent, respectively, above the all-time low levels of 1930.

Such decreases in the catch per unit of effort as occurred in 1945 may result from fluctuations in the availability of halibut as well as from actual changes in abundance. They are not cause for concern unless they are continued throughout several consecutive years and reverse the trends of abundance which have been generally upward since 1930.

Study of the changes taking place in the size and age composition of the marketable stocks of halibut in Area 2, necessary for a proper understanding of changes in abundance, were continued as well as the short fishing season would permit by sampling the landings of commercial fishing vessels. More than 12,000 halibut were measured from 16 trips and materials for the determination of age composition were taken from approximately 2,000 of these.

Investigations of the success of spawning, which were abandoned in the winter of 1943-44 because of wartime conditions, were resumed in 1945 on a more restricted scale than in previous years. A vessel was chartered and operated for the purpose in the vicinity of Cape St. James, British Columbia, from January 2 to February 27. In spite of very unfavourable weather, 131 net hauls were made at 67 stations to determine the abundance of eggs and larvae. Analysis of the catches showed that the production of spawn was above the level from 1939 to 1942 inclusive but below the high level of 1937.

The Commission's investigations of the halibut and of the halibut fishery continued to measure and explain the changes occurring in the stocks of halibut and to provide a factual basis for continued regulation.

The recent growth of the Pacific otter trawl fishery for flounders and other bottom fishes and the expansion of this fishery to important halibut grounds in Area 2 have become a matter of interest to the Commission, which is concerned because of the unfavourable effect that otter trawling could have upon its program for the rehabilitation of the halibut fishery.

Members of the Commission's scientific staff made several trips upon commercial otter trawl vessels in 1943 and 1944 to observe the amount, size and condition of halibut caught in otter trawl gear. In 1945, observations of the distribution of trawl vessels and of the amount of halibut caught incidentally by them on different grounds along the British Columbia coast were made through the courtesy of the Department of Fisheries which provided accommodation for a staff member on one of its fishery patrol vessels. The results of observations were variable and inconclusive but were sufficient to indicate a need for comprehensive investigations of the effect of otter trawling not only upon the stocks of halibut but also upon the stocks of other species.

A meeting of the Commission was held at Vancouver on April 19 to examine recommendations of the halibut fleets for revision of the 1937 treaty in the light of past and possible future developments in the fishery. It was decided to prepare and distribute a memorandum on suggested treaty changes to all branches of the halibut industry for their consideration and comment and to hold a public hearing on the subject after the close of the halibut fishing season. These steps were subsequently taken.

The annual winter meetings of the Commission were held at Seattle from November 28 to 30, inclusive. Matters connected with the investigation and regulation of the halibut fishery and proposals for treaty revision were considered.

In the afternoon of November 28 and in the morning of November 30 the Commission met with the Conference Board composed of representatives of the halibut fishing fleets of Washington, British Columbia, and Alaska. The results of the Commission's investigations were discussed and recommendations for regulation of the fishery in 1946 were received.

A public hearing on proposed treaty changes was held on November 29. Representatives of the halibut fleets and otter trawl groups on all parts of the coast, fish dealers handling more than 55 per cent of the Pacific halibut catch, and other interested persons attended. Previous recommendations for revision of the halibut treaty were discussed and additional suggestions were received from the floor.

At the close of the public hearing the Commission met with a delegation of otter trawl fishermen from Washington, Oregon, and British Columbia to discuss problems arising from the incidental capture of halibut by the bottom net fishery.

Members of the Commission were, as in 1944: Mr. G. W. Nickerson and Mr. A. J. Whitmore, for Canada; Mr. Edward W. Allen and Mr. Charles E. Jackson, for the United States. Mr. Nickerson served as Chairman and Mr. Allen as Secretary. At the November meeting Mr. Allen was elected Chairman for the years 1946 and 1947 and Mr. Nickerson as Secretary.

### RECEIPTS FROM PRIBILOF SEALSKINS

Canada's net return on Pribilof sealskin account in 1945-46 amounted to \$613,518. Gross receipts totalled \$1,013,880, less a few cents, and were made up of the amount received from 11,499 pelts which were sold through Montreal fur auctions by the Department of Fisheries, which acts for the Government in fur seal matters, plus Canada's 20 per cent share of the gross proceeds from skins sold by the United States Government. The Montreal sales brought in \$694,832 and the return to Canada from the United States sales was \$319,047. Over against the gross Canadian receipts, however, there were offsetting expenditures of something over \$400,300, leaving the Canadian net for the year at \$613,518. Processing and transportation charges accounted for most of the expense total.

Under the provisional sealing agreement now in effect between the two countries, Canada is entitled each year to 20 per cent of the number of sealskins taken by the United States at the Pribilof Island rookeries in Bering Sea. (Under the former Pelagic Sealing Treaty between Britain, the United States, Russia, and Japan, which ceased to be operative in 1941, Canada's share of the annual Pribilof "take" was 15 per cent.) In 1945 a total of 76,964 skins were taken, which meant that the Canadian share was 15,393. Of the latter number 11,992 skins were sent to London for processing and 3,401 to St. Louis.



## FISHING BOUNTY

Payments of 1945 fishing bounty under authority of the Act to Encourage the Developing of Deep-sea Fishing and the Building of Fishing Vessels were made to the owners of 9,528 Atlantic boats and vessels and to 18,541 men fishing on these craft. As in other years, the total amount available for use as bounty was \$160,000 and it was divided among eligible applicants on the following basis: To boat fishermen entitled to receive payment under the bounty regulations, \$7.30 each; to eligible vessel fishermen, \$7.85 each; to owners of fishing boats with keel of not less than 12 feet, \$1 each; to eligible vessels, \$1 per registered ton, with maximum payment to any one vessel \$80. Both in the case of fishing craft and fishermen the aggregate numbers receiving bounty were smaller than in 1944—a decrease of 187 in boats and vessels and a decrease of 1,168 in fishermen.

The following table sets out details of distribution for the year:

Province and County	Boats	Men	Amount	Vessels	Tons	Average Tons	Men	Amount	Total Amount
<i>Nova Scotia—</i>									
Annapolis.....	187	263	2,106 75						2,106 75
Antigonish.....	111	162	1,293 60						1,293 60
Cape Breton.....	213	365	2,877 50	77	1,089	14	276	3,255 35	6,132 85
Digby.....	251	455	3,572 50	41	505	12	96	1,258 60	4,831 10
Guysboro.....	506	798	6,331 40	38	537	14	99	1,314 13	7,645 55
Halifax.....	721	1,024	8,196 05	22	434	20	122	1,391 70	9,587 75
Inverness.....	182	444	3,423 05	20	238	11	116	1,138 60	4,561 65
Kings.....	48	63	507 90						507 90
Lunenburg.....	616	767	6,215 10	44	2,419	55	796	8,667 10	14,882 20
Pictou.....	24	40	316 00						316 00
Queens.....	156	234	1,864 05	23	306	13	65	816 25	2,680 30
Richmond.....	306	589	4,605 55	15	189	13	47	557 95	5,163 50
Shelburne.....	503	784	6,225 75	129	1,670	13	401	4,817 85	11,043 60
Victoria.....	212	340	2,693 55	14	169	12	56	608 60	3,302 15
Yarmouth.....	111	230	1,790 00	74	953	13	207	2,577 70	4,367 70
Cumberland.....	1	1	8 30						8 30
Hants.....	2	2	16 30						16 30
Totals.....	4,150	6,561	\$52,043 35	497	8,499	17	2,281	26,403 85	\$78,447 20
<i>New Brunswick—</i>									
Charlotte.....	150	296	2,310 65	31	399	13	104	1,215 40	3,526 05
Gloucester.....	390	773	6,030 20	119	2,239	19	472	5,943 20	11,973 40
Kent.....	150	263	2,069 90	20	247	12	42	576 70	2,646 60
Northumberland.....	42	106	815 80	23	248	11	70	797 50	1,613 30
Saint John.....	12	20	158 00						158 00
Westmoreland.....	54	100	783 70						783 70
Totals.....	798	1,558	12,168 25	193	3,133	14	688	8,532 80	20,701 05
<i>Prince Edward Island—</i>									
Kings.....	229	327	2,615 20						2,615 20
Prince.....	380	656	5,165 50						5,165 50
Queens.....	142	259	2,032 70						2,032 70
Totals.....	751	1,242	9,813 40						9,813 40
<i>Quebec—</i>									
Bonaventure.....	310	587	4,587 90	37	456	12	143	1,578 55	6,166 45
Gaspé.....	1,247	2,075	16,389 85	128	1,794	14	524	5,907 40	22,297 25
Matane.....	54	98	769 40						769 40
Magdalen Islands.....	624	1,532	11,807 30						11,807 30
Saguenay.....	739	1,252	9,873 20						9,873 20
Totals.....	2,974	5,544	43,427 65	165	2,250	13	667	7,485 95	50,913 60
GRAND TOTAL.....	8,673	14,905	\$117,452 65	855	13,882	15	3,636	42,422 60	159,875 25

NOTE.—A number of late claims, amounting in all to \$1,453.65 and included in this statement, are for the season of 1944. As the basis of distribution for 1944 differed from that of 1945, a number of figures in the "Amount" column do not, as a result, balance with the number of claims paid.

D. H. SUTHERLAND,  
Assistant Deputy Minister.



## APPENDIX No. 1

## ANNUAL REPORT OF CHIEF SUPERVISOR OF FISHERIES (MAJOR J. A. MOTHERWELL), WESTERN DIVISION (BRITISH COLUMBIA), FOR 1945

In dollars and cents, marketed value, the fisheries of British Columbia reached the record high total in 1945 of approximately \$44,500,000, compared with the previous record in 1942 of \$38,059,559. This was largely due to the return from salmon, which increased to \$25,423,029. Six varieties which make up the very large portion of the total are shown in the following statement, which is given subject to final revision:

	Total Marketed Value
Salmon .....	\$25,423,029
Herring .....	8,423,136
Pilechards .....	1,439,145
Ling Cod .....	1,166,738
Halibut .....	3,318,215
Grayfish .....	2,347,631

## SALMON

Due to a very satisfactory supply of the raw product, particularly in the case of pinks, the pack of all varieties of salmon totalled 1,739,311 cases, compared with a total of 1,097,557½ in the previous year. This compares with an average of 1,640,416 cases for the previous five years, as shown below. Amongst the outstanding features of this year's production were the large supplies of pinks in the Butedale, Bella Bella, Bella Coola, and Fraser River districts, but again there was a disappointing run of chums over practically the whole province:

	Cases
1926-1930 .....	1,816,763
1931-1935 .....	1,228,631
1936-1940 .....	1,620,863
1941-1945 .....	1,640,416

## SOCKEYE

The pack of 329,001½ cases was a fair average, compared with recent years, as shown below. In the previous year the total was 247,714 cases, and the average for the past five years 372,695 cases:

	Cases
1926-1930 .....	321,510
1931-1935 .....	312,450
1936-1940 .....	364,908
1941-1945 .....	372,695

Notwithstanding that in the northern districts, including the Naas and Skeena rivers, the Bella Coola, Rivers Inlet and Smiths Inlet districts, fishing was permitted from June 24, fishermen did not commence operations until July 1, owing to the fact that the final decision regarding prices they were to receive for the several varieties had not been agreed upon. There were also fewer boats operating than might have been expected, due to the attraction of other varieties of fish in the early part of the season, such as the grayfish, particularly along the east coast of the Queen Charlotte Islands. Another factor of interest in the sockeye gill-net fishery was the number of gill-net boats operating, compared with the average over the previous 10 years, in the following districts:

Naas River, 158 compared with an average of 264.

Skeena River, 787 compared with an average of 867.

Rivers and Smiths Inlets, 1,167 compared with an average of 1,663.

Fraser River, 2,706 compared with an average of 2,326.

*Naas River Area.*—Sockeye salmon caught in the Naas area produced 9,751 cases, compared with 13,810 cases in the brood year of 1940, and 24,876 cases in the brood year of 1941. Two hundred and fifty-four gill-net boats operated in 1940, and 281 in 1941, and 158 in 1945. The escapement to the spawning grounds was good.

*Skeena River Area.*—Sockeye caught in the Skeena River area produced 103,939½ cases, compared with 116,505 cases in 1940, and 81,183 cases in 1941. Nine hundred and twenty-six gill-net boats fished in 1940 and 981 in 1941, compared with 787 in 1945. There was an excellent escapement to the Skeena spawning grounds.

*Rivers and Smiths Inlets.*—The combined pack of these two inlets reached a total of 101,791 cases, compared with a total of 89,142 cases in 1940, and 115,342 cases in 1941. Eighteen hundred and ninety-six gill-net boats fished in 1940 and 1,355 in 1941, compared with 1,167 in 1945. The seeding in both areas is reported as good.

*Fraser River Area.*—This area produced 77,412½ cases of sockeye, compared with 149,716 cases in 1941. The pack was again largely from the runs to the Chilco area, as supplies to other parts of the Fraser system above Hell's Gate were small, as expected, though showing an increase over the seedings of the brood years, continuing the improvement which has been shown in recent cycles. One feature of this year's run to the upper portion of the Fraser watershed was the excellent physical condition in which the fish arrived. Their green state and lack of injury was evidence that they had been able to pass up the long reaches of the Fraser River without having to fight their way through such conditions as previously prevailed at Hell's Gate, for instance.

#### COHOES

The runs of cohoes this year produced 212,217 cases, compared with 187,873½ cases in the brood year, 1942. These figures do not tell the whole story, however, as larger quantities than usual of these salmon were placed in cold storage and used fresh. The total compares with an average of 184,427 cases packed during the past three years, as shown below:

	Cases
1931-1933 .....	124,878
1934-1936 .....	208,130
1937-1939 .....	194,855
1940-1942 .....	263,274
1943-1945 .....	184,427

#### PINKS

The pink pack of 825, 512½ cases compares with 530,188½ cases in the brood year of 1943, and an average for the past two years of 607,602 cases. The unusually large pack was the result of exceptionally good runs to the Butedale, Bella Bella, Bella Coola, and Fraser River areas. Notwithstanding the large catch the spawning grounds are reported to have received an excellent seeding:

	Cases
1932-1933 .....	378,137
1934-1935 .....	475,165
1936-1937 .....	588,554
1938-1939 .....	510,735
1940-1941 .....	320,838
1942-1943 .....	400,405
1944-1945 .....	607,602

## CHUMS

A total of 350,188 cases of chums were packed, compared with an average during the past four years of 400,671 cases. No information is available as to why the run should have been so small, in view of the reportedly good condition of the spawning areas in 1940 and 1941:

	Cases
1926-1929 .....	463,665
1930-1933 .....	638,077
1934-1937 .....	12·5
1938-1941 .....	264,375
1942-1945 .....	623,077
	400,671

## SALMON-GENERAL

The number of sockeye salmon required to fill a case of 48 one-pound talls, in the several more important gill-net areas, during the season of 1945 was as follows:

Fraser River .....	12·7
Naas River .....	12·07
Skeena River .....	12·5
Rivers Inlet .....	14·2
Bella Coola .....	16
Butedale .....	11

## INSPECTION OF CANNED SALMON

The following are the detailed results of the year's inspection of canned salmon at the laboratory maintained by the Department in Vancouver:

Number of inspections .....	1,551
Total number of cases inspected .....	1,723,336
Total number of cases below certificate standard .....	90,000
Total number of cases eligible for certificates .....	1,633,336

## DETAILS OF INSPECTIONS ACCORDING TO SPECIES

Species	Number of cases inspected	Number of cases below certificate standard	Number of cases eligible for certificates
Sockeye .....	330,340	3,937½	326,402½
Springs .....	12,310½	117	12,193½
Steelheads .....	2,556	.....	2,556
Bluebacks .....	6,361	1,015	5,346
Coho .....	207,438	2,336	205,102
Pinks .....	821,693	77,663½	744,029½
Chums .....	342,637½	4,931	337,706½
Totals .....	1,723,336	90,000	1,633,336

## PARTICULARS OF NON-CERTIFIED SALMON ACCORDING TO SPECIES

Species	Grade B	Tips and Tails	Minced, Flakes, etc.	Totals
Sockeye .....	182	1,983½	1,772	3,937½
Springs .....	95	10	12	117
Steelheads .....	.....	.....	.....	.....
Bluebacks .....	.....	114	901	1,015
Coho .....	30	1,249	1,057	2,336
Pinks .....	76,752½	848	63	77,663½
Chums .....	4,854	77	.....	4,931
Totals .....	81,913½	4,281½	3,805	90,000

None of the 1945 pack of canned salmon was graded as below B.

The report of the Chief Chemist covering the year's operations at the laboratory will be found as Appendix No.

Salmon inspection fees collected, at the rate of one-half cent per case, amounted to \$8,584.86.

### SALMON FOR UNITED KINGDOM

The British Ministry of Food and other British agencies, through the federal Department of Fisheries, took over the whole British Columbia salmon pack, with the exception of 304,000 cases reserved for domestic consumption. The total available to British agencies was 1,405,311 cases, as shown below:

	1941 Cases	1942 Cases	1943 Cases	1944 Cases	1945 Cases
TOTAL PACK.....	2,248,870	1,812,254	1,255,508½	1,097,557½	1,737,311
<i>Distribution:</i>					
Canada.....	549,178½		200,000	250,000	304,000
Canadian Red Cross.....	17,599	49,851	50,000	52,000	
Department of Munitions and Supply.....		14,227	50,000	20,000	30,000
Australia.....	37,112½				
South Africa.....	2,507½				
Other Countries.....	10,140½				
*B.W. Indies, Africa and Ships' Stores.....		52,620			
British West Indies.....			38,247		
Eastern Hemisphere.....			33,670		
L.F.C. Areas.....				147,112½	
Sub-grade Salmon.....	113,973½				
Samples, culls, etc.....		2,402			
British Ministry of Food.....	1,518,358½	1,693,154	883,591½	628,445	1,405,311

\* After the year 1942 "Ships' Stores" were included under the Department of Munitions and Supply.

The prices paid to the operators were as follows:

	1-lb. tall cans 48 cans to case	½-lb. flat cans 96 cans to case	¼-lb. flat cans 96 cans to case
	\$ cts.	\$ cts.	\$ cts.
<i>Certificate Quality—</i>			
<i>Salmon:*</i>			
Group I.....	17 65	18 90	11 20
Group II.....	12 90	14 15	8 82½
Group III.....	7 65	8 90	5 70
<i>Tips and Tails, Minced or Flaked Salmon, and Grade B Salmon:*</i>			
Group I.....	13 85	15 15	9 30
Group II.....	11 20	12 50	8 00
Group III.....	6 75	8 90	5 25
<i>Grade B Tips and Tails and Minced or Flaked Salmon:*</i>			
Group I.....	10 10	11 35	7 40
Group II.....	9 55	10 80	7 15
Group III.....	5 85	7 10	4 80

\* Under the arrangements with the British authorities regarding canned salmon supplied, Group I consisted of sockeye, Group II of Red springs, cohoes, bluebacks and steelheads, and Group III of pinks, rhums and White springs.



## SALMON TAKEN BY INDIANS OF THE PROVINCE FOR PURPOSES OF THEIR OWN FOOD SUPPLIES, UNDER FREE PERMIT -

	Sockeye	Springs	Coho	Pinks	Chums	Steel-heads	Total
	(fish)	(fish)	(fish)	(fish)	(fish)	(fish)	(fish)
District No. 1.....	40,728	6,814	5,994	3,893	2,545	1,554	61,528
District No. 2.....	92,061	4,725	17,591	13,397	16,211	4,464	148,449
District No. 3.....	5,866	5,460	5,830	4,888	53,450	257	75,751
Totals.....	138,655	16,999	29,415	22,178	72,206	6,275	285,728

## HALIBUT

Halibut fishing opened on May 1st, two weeks later than the opening date of the preceding season. Area No. 2 was closed on June 15, after a season of 46 days only. This was four days shorter than the open season in the previous year. Area No. 3 closed on September 24, compared with November 30, in 1944.

The total landings at all points in British Columbia amounted to 194,763 hundredweights compared with 189,248 hundredweights in the previous year, as shown in Statement No. 7. Canadian landings of halibut were the heaviest for many years, whilst deliveries from United States vessels were light. These conditions were partly the result of the favourable ceiling prices at ports in Alaska, which are closer to the fishing grounds.

The following statement shows the combined landings from Canadian and United States vessels at the several centres in the province since 1930:

Year	Vancouver and New Westminster	Prince Rupert	Butedale-Namu Area	District No. 3	Totals
	cwts.	cwts.	cwts.	cwts.	cwts.
1930.....	11,387	239,617	978	2,814	254,796
1931.....	8,498	167,757	3,727	2,123	182,005
1932.....	11,883	148,615	6,677	1,672	168,847
1933.....	13,436	144,065	10,431	2,440	170,372
1934.....	16,113	150,476	13,297	2,716	182,602
1935.....	22,351	129,586	15,713	3,493	171,143
1936.....	20,777	131,830	11,522	3,992	168,121
1937.....	23,334	147,638	12,676	3,777	187,425
1938.....	28,155	141,691	17,776	5,866	193,488
1939.....	30,225	173,857	18,651	4,455	227,188
1940.....	26,010	185,921	23,157	3,955	239,043
1941.....	22,057	166,513	30,946	10,142	229,658
1942.....	30,547	180,789	21,638	10,941	243,915
1943.....	44,201	180,507	12,003	13,323	250,034
1944.....	30,779	133,744	12,356	12,369	189,248
1945.....	21,151	152,828	13,326	7,458	194,763

## HALIBUT FOR UNITED KINGDOM

During the year there was shipped to the United Kingdom for account of the British Ministry of Food, 3,447,483 pounds of frozen halibut.

## HERRING—GENERAL

The total herring tonnage taken by fishermen during the year amounted to 128,826·8, used as follows:

	District No. 1	District No. 2	District No. 3	Total	Green Tons
Catch.....cwts.	5,715	807,823	1,762,998	2,576,536	128,826·8
<i>Production—</i>					
Marketed fresh.....cwts.	5,766		857	6,572	331·15
Marketed frozen.....cwts.	5,714			5,714	285·7
Canned.....cases	1,071,946	92,701	207,967	1,372,614	54,904·56
Kipperd.....cwts.	3,890	99	173	4,162	416·20
Bloaterd.....cwts.	21		8	29	2·90
Kipperd Snacks.....cases	12,442			12,442	
Herring Oil.....lbs.	257,580	3,015,310	3,039,621	6,312,511	
Herring Offal Oil.....lbs.	3,684,293	45,227	284,344	4,013,864	68,007·79
Herring Meal.....tons	303·05	5,367·5	4,560	10,230·55	
Herring Offal Meal.....tons	2,546·15	92·2	108	2,746·25	
Used for Bait.....bbls.	12,047	22,924	13,169	48,140	4,814·0
Pickled.....bbls.	376		54	430	64·50

A total of 1,372,614 cases was canned during the year, as shown below, representing a total value of \$6,490,872. The whole pack was taken over by the British Ministry of Food and other government agencies:

Year	Cases
1939.....	233,046
1940.....	727,292
1941.....	1,013,329
1942.....	1,540,918
1943.....	1,372,775
1944.....	1,130,527
1945.....	1,372,614

In view of the success experienced during the previous season, particularly, in the locating of herring schools by means of the echo-sounding device, this equipment has become practically standard in herring purse-seining.

## HERRING INSPECTION

Following are the detailed results of the year's inspection of canned herring at the laboratory maintained by the Department in Vancouver:

## CANNED HERRING INSPECTIONS FOR THE YEAR 1945

Total number of inspections.....	414
Total number of cases inspected.....	1,286,693
Total number of cases below certificates standard.....	3,367
Total number of cases available for certificates.....	1,283,326

## DETAILS OF INSPECTIONS ACCORDING TO SIZES

	Plain			Tomato Sauce			Totals
	48-1 lb. Talls	48-1 lb. Ovals	48-½ lb. Ovals	48-1 lb. Talls	48-1 lb. Ovals	48-½ lb. Ovals	
Total inspected.....	102,688	857,461	16,780½	26,106	221,780	61,877½	1,286,693
Grade "B".....	1,628				1,188		2,816
Below Grade "B".....	504				47		551
Certificate Quality.....	100,556	857,461	16,780½	26,106	220,545	61,877½	1,283,326

## GRADE B AND BELOW GRADE B

	Plain			Tomato Sauce			Totals
	48-1 lb. Talls	48-1 lb. Ovals	48- $\frac{1}{2}$ lb. Ovals	48-1 lb. Talls	48-1 lb. Ovals	48- $\frac{1}{2}$ lb. Ovals	
Grade "B" .....	1,628	.....	.....	.....	1,188	.....	2,816
Below Grade "B" .....	504	.....	.....	.....	47	.....	551
	2,132	.....	.....	.....	1,235	.....	3,367

Inspection fees collected, at the rate of one-half cent per case, amounted to \$6,117.53.

## PILCHARDS

Landings of pilchards amounted to 34,437 green tons and were disposed of as follows:

	Quantity	Value
		\$
Caught and landed..... tons	34,437	619,884
Marketed—		
Canned..... cases	78,854	369,160
Used as bait..... bbls.	92	368
Pilchard oil..... lbs.	10,686,388	673,250
Pilchard meal..... tons	5,939.85	396,367
Total marketed value.....		1,439,145

## VIOLATIONS

There were 117 prosecutions during the year for violation of the Fishery Regulations, resulting in a total revenue of \$10,952.37. Details are as follows:

	District No. 1	District No. 2	District No. 3	Totals
Prosecutions.....	33	45	39	117
Fines.....	\$ 634 50	\$ 2,050 00	\$ 1,472 00	\$ 4,156 50
Sales.....	1,229 98	5,050 64	515 25	6,795 87
Total—Fines and sales.....	\$ 1,864 48	\$ 7,100 64	\$ 1,987 25	\$ 10,952 37

## EXPORT PERMITS

On behalf of the Department of Trade and Commerce, export permits for fish products were issued as shown below:

	Vancouver Office	Victoria Office	Prince Rupert Office	Totals
U.S.A.....	732	106	277	1,115
British Empire.....	319	.....	.....	319
Other countries.....	34	.....	.....	24
	1,085	106	277	1,468

## DEPARTMENT OF FISHERIES

## GRAYFISH OPERATIONS

The following statement shows details of this fishery. It will be noted that there was a considerable reduction in the number of licences issued and the quantity of livers landed:

Year	Licences Issued	Liver Landings	Average Price to Fishermen
		lbs.	cents
1940.....	406	1,566,500	6
1941.....	898	3,552,576	9
1942.....	1,235	4,241,286	16
1943.....	2,049	5,121,186	25
1944.....	3,066	7,769,574	34
1945.....	2,170	5,821,849	31

## CLAMS

The following statement shows a pack of only 4,693½ cases of clams, which is a considerable reduction from the outputs in most years covered by the statement. This is due, of course, to the low ceiling price of canned clams in Canada, compared with that in the United States. Much of the raw product from British Columbia was exported to the United States for canning in that country:

Year	Marketed Fresh (Cwts.)	Canned (Cases)
1934.....	6,332	5,815
1935.....	15,716	10,209
1936.....	26,530	12,579
1937.....	27,018	12,587
1938.....	42,169	22,155
1939.....	21,601	5,431
1940.....	20,785	7,151
1941.....	25,402	12,783
1942.....	8,278	17,808
1943.....	8,397	13,626
1944.....	9,869	12,474
1945.....	39,834	4,693½

## TUNA

Tuna catches landed at British Columbia ports during the past seven years are shown in the following statement:

Year	Quantity (Cwts.)	Value (\$)
1939.....	2,838	14,190
1940.....	45	225
1941.....	760	6,840
1942.....		
1943.....	288	5,760
1944.....	4,636	79,676
1945.....	14,287	297,983

It will be observed that tuna operations have become very important.



There were 75 British Columbia fishing boats licensed to operate for tuna during the year. Some of these were boats of the salmon trolling type, some halibut boats which joined the tuna fleet after the halibut areas were closed, and some were new—boats specially constructed for the purpose of tuna fishing.

In view of the fact that the tuna fishing grounds are so far from shore a very seaworthy type of fishing boat is required. The type so far used by British Columbia fishermen enables the fishermen to operate as far as from 50 to 150 miles from their home port. The tendency is to acquire larger boats which will permit of operations still farther from port where the Canadian fishermen could compete with those of other countries. All the tuna landed at British Columbia ports during the year was frozen in Canadian cold storage plants and later shipped to the United States for canning. Tuna canning was not practicable in this province owing to the low Canadian ceiling on the canned product. The operators found that the low ceiling precluded their processing the product in this country at a profit.

#### DESTRUCTION OF SEA LIONS

The number of sea lions destroyed during the year by the members of the crews of the several departmentally operated patrol boats totalled 283, as follows:

Area	Number Destroyed
Satellite Channel .....	9
Barkley Sound .....	15
Deepwater Bay .....	2
Squirrel Cove .....	10
Kingcome and Knight Inlets .....	195
Virgin Rocks .....	42
Various Rookeries .....	10
Total .....	283

#### DESTRUCTION OF HAIR SEALS

Claims for 1,941 hair seals, destroyed by fishermen, were paid at \$5 each, totalling \$9,705.

#### PATROL SERVICE

During the year three very efficient 60-foot patrol boats were obtained by the Department, having been declared surplus by the R.C.A.F. They are built on the plans of one of the most seaworthy halibut boats of the Pacific fleet, and are powered with diesel engines. It is probable, however, that, in view of the speed of the craft which have been acquired by the industry in recent years, it will be imperative that these three boats be re-powered with engines which will give a cruising speed of at least 12 knots.

An attempt was made during the year to obtain the assistance of the R.C.A.F. in the inspection of spawning grounds and patrol work, but it was found that the necessary type of 'plane was not available when required, and these efforts had to be abandoned.

A radiotelephone was installed in the C.G.S. *Kitimat* and was found to be of immense value in the supervision of the fisheries. Provision of such equipment for an additional number of the larger boats in this service would be a great help in the protection of the fisheries.

## REMOVAL OF OBSTRUCTIONS IN SALMON STREAMS AND BUILDING OF FISHWAYS

During the year the sum of \$12,390.43 was expended in the work of clearing log jams and other obstructions from salmon streams in the province, and building and improving fishway facilities which permit fish easier access to their spawning grounds. The most important of these expenditures was the construction of a fishway in the Puntledge River, which now permits salmon and trout to pass through the impounding dam, maintained by Canadian Collieries (Dunsmuir) Limited. Reference to the work done in this regard will be found in the report of the departmental engineer.

A dam, which has existed for many years in the Adams River, at the outlet of Adams Lake, was removed by the International Pacific Salmon Fisheries Commission, under the supervision of a federal Department of Fisheries engineer. The removal of this obstruction should assist very materially in the efforts toward the utilization, by spawning sockeye, of the large areas of and tributary to Adams Lake.

## SPORT FISHING

During the war years the gasoline restrictions were responsible for curtailing, to a considerable extent, the sport fishing operations by means of power boats. Much of the fishing was done from row boats but naturally these operations could only be conducted reasonably close to shore. With the easing of gasoline restrictions the number of anglers increased considerably and fishing was found to provide very satisfactory results. The principal varieties concerned are the spring and coho salmon, which are taken by means of trolling and the fly. The most popular areas, and the ones producing the best fishing, were Horseshoe Bay and Howe Sound in the vicinity of Vancouver, Discovery Passage, Baynes Sound, and the famous Campbell River district, the estuary of the Qualicum rivers, the well known Saanich Inlet-Cowichan Bay area, in the vicinity of Duncan, the waters off the City of Victoria, and the head of Alberni Canal. Steelheads are taken in the Vedder River and Chilliwack River systems, the streams tributary to the north shore of Burrard Inlet, streams along the east coast of Vancouver Island, and in the Barclay Sound area. Cutthroat trout are also taken at the mouths and in the tidal portions of the streams along the east coast of Vancouver Island.

These several species are again proving a great attraction for the increased numbers of tourists, who annually come to British Columbia and fill to capacity the modern and comfortable fishing lodges in the sport fishing areas.

STATEMENT No. 1—ANNUAL CANNED SALMON PRODUCTION IN BRITISH COLUMBIA—1937-1945

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned									
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	Totals
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases
1937.....	37	6,095	3,162	291	9	5	325,774	10,963	1,788	3,420	19,236	844	113,972	585,576	447,602	1,509,175
1938.....	38	7,125	3,453	300	9	5	447,453	10,276	2,322	2,933	27,417	1,035	273,706	400,876	541,812	1,707,830
1939.....	35	6,502	3,947	339	9	5	269,888	10,302	2,848	2,947	48,209	797	196,887	620,595	386,584	1,539,057
1940.....	38	6,392	3,222	350	9	5	366,403	11,868	2,856	3,017	23,277	1,205	201,467	213,911	643,443	1,467,227
1941*.....	36	5,502	3,080	333	9	5	455,297	17,794	3,911	28,771	30,027	3,454	361,380	427,766	920,470	2,248,870
1942.....	30	6,382	3,878	312	9	5	666,571½	11,197½	3,826	9,721	23,265½	4,649	187,873½	270,622½	633,834	1,811,560½
1943.....	30	6,043	4,346	290	9	5	164,889	4,171½	2,199	4,287½	14,059½	3,095	171,983	530,188½	363,347½	1,258,221½
1944.....	30	5,426	4,483	293	10	5	247,714	3,663½	2,368	13,330½	12,464	3,926½	169,082½	389,692	255,316½	1,097,557½
1945.....	29	5,646	4,764	312	9	5	329,001½	3,666½	2,686	6,447½	6,670	2,922	212,217	825,512½	350,188	1,739,311

\* Does not include Salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:—

.....	8	31	1,079	.....	39,104	.....	6,339	46,561
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\* Does not include Salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:—

.....	8	31	1,079	.....	.....	39,104	.....	6,339	46,561
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NOTE.—Licences issued include transfers from one district to another, except in the case of purse-seines.

STATEMENT No. 2.—PACK OF CANNED SALMON ON THE NAAS RIVER—1937-1945

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued				Packed canned									
		G.N. Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	Totals
*1937	2	321				17,590	773	245	232		46	12,336	7,876	10,530	49,628
†1937						11,630	773	245	232		46	316	5,688	6,009	24,939
*1938	2	309				21,746	458	189	125		188	20,485	61,660	15,135	119,986
†1938						14,795	13	165	125		188	3,986	29,843	6,804	55,919
*1939	2	289				24,425	170	389	149		15	3,209	29,819	2,615	60,791
†1939						18,834	17	297	137		15	1,667	19,479	1,784	42,230
*1940	2	254				13,810	1,258	181	275		120	11,447	29,893	5,461	62,445
†1940						8,056	118	95	99		117	1,975	12,151	2,149	24,750
*1941	2	281				24,876	133	187	207		377	14,430	23,274	5,971	69,455
†1941						14,221	16	125	147		147	6,711	12,570	1,757	35,694
*1942	2	328				24,461	496	366	255		619	21,008	54,038	12,691	113,934
†1942						11,415	46	202	159		155	9,804	24,693	5,794	52,268
*1943		167				13,413	422	386	194		334	9,769	17,670	10,156	52,344
†1943															
*1944	1	186				13,318	334	179	109		318	7,324	34,707	10,155	66,445
†1944						2,681	73		32		23	389	14,375	2,423	19,997
*1945	1	158				9,751	145	30	34		107	3,980	36,167	4,528	54,743
†1945						4,479	46		19		45	1,277	18,835	1,676	26,378

\* Pack of fish caught at Naas River regardless where canned.

† Pack of Naas River regardless where caught.

NOTE.—Licences issued, include transfers from other districts.



STATEMENT No. 3.—PACK OF CANNED SALMON ON THE SKEENA RIVER—1937-1945

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned							Totals				
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho		Pink	Chum		
								cases	cases	cases	cases	cases	cases		cases	cases	cases	cases
†1937.....	7	850					55,811	3,788	382	315				21	34,502	72,455	37,431	204,705
†1937.....							41,023	3,704	382	315				21	14,573	57,623	10,027	127,668
†1938.....	6	1,049					73,508	3,361	1,165	259				42	100,658	146,676	34,785	360,454
†1938.....							46,988	2,916	1,141	259				42	38,542	69,299	14,668	173,855
†1939.....	6	844					96,358	3,277	1,488	348				55	48,973	127,521	15,666	293,686
†1939.....							68,388	3,124	1,396	336				55	27,115	91,559	6,360	198,333
†1940.....	7	926					133,854	5,884	1,113	571				133	62,516	91,612	62,114	359,797
†1940.....							116,505	4,708	1,017	396				130	19,196	46,687	4,684	193,323
†1941.....	7	981					110,544	4,685	703	448				2,261	126,557	73,896	54,357	373,461
†1941.....							81,183	3,929	641	368				1,890	45,891	51,389	12,138	197,429
†1942.....	6	775					57,539	5,850	874	832				3,670	70,384	146,322	31,481	316,952
†1942.....							29,976	5,305	699	617				3,117	36,395	47,819	10,611	134,539
†1943.....	8	749					51,476	1,443	838	623				2,323	63,638	122,040	57,579	299,961
†1943.....							28,259	964	440	379				1,953	40,280	53,203	6,407	131,886
†1944.....	8	725					92,203	1,176	664	289				2,724	38,150	190,872	87,071	413,159
†1944.....							67,855	897	468	193				2,395	18,809	45,833	7,172	143,623
†1945.....	7	787					117,859	1,324	827	389				1,612	51,904	211,140	44,104	429,160
†1945.....							103,939	1,208	785	363				1,538	33,672	69,148	9,121	219,775

† Pack of fish caught at Skeena river regardless where canned.  
NOTE.—Licences issued include transfers from other districts.

‡ Pack at Skeena river regardless where caught.

STATEMENT No. 4—PACK OF CANNED SALMON FROM FISH CAUGHT AT RIVERS INLET AND SMITHS INLET—1937-1945

Year	Num-ber of can-eries oper-ated	Number of salmon licences issued					Packed canned									
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	Totals
						cases	cases	cases	cases	cases	cases	cases	cases	cases	cases	cases
1937	6	1,875					108,170	377	396	235		75	6,374	7,973	18,894	142,494
1937							91,399	335	452	233		76	5,351	18,873	21,931	138,631
1938	6	2,261					122,083	744	181	359		169	17,527	10,827	15,832	167,732
1938							86,490	716	136	351		99	14,284	12,447	17,102	131,625
1939	4	1,817					71,068	412	206	329		133	16,125	14,580	7,437	110,290
1939							36,937	285	32	306		82	6,302	19,256	4,903	68,103
1940	4	1,896					89,142	810	238	320	21	91	12,744	4,085	15,167	122,618
1940							48,535	494	101	294		40	7,452	4,315	2,369	63,600
1941	2	1,355					115,342	1,006	148	667		179	25,165	5,558	23,203	171,268
1941							50,238	624	78	593		104	16,067	6,193	6,236	80,193
1942	1	1,505					95,062	745	104	144		60	10,280	1,481	21,364	129,240
1942							24,623	577	82	129		19	6,189	1,446	10,295	43,360
1943	1	1,449					66,855	223	591	208		135	12,270	16,093	17,376	113,751
1943							13,301	72	437	64		25	6,596	23,347	15,892	59,734
1944	1	1,090					40,859	107	623	140		88	14,843	6,280	5,205	68,145
1944							8,969	16	568	94		64	9,525	11,863	2,580	33,679
1945	1	1,167					101,791	154	708	204		354	18,034	12,369	20,515	154,129
1945							24,211	26	449	88		110	12,451	22,390	19,583	79,308

STATEMENT No. 5—PACK OF CANNED SALMON IN THE FRASER RIVER DISTRICT—1937-1945

Year	Num-ber of can-neries open-ated	Number of salmon licences issued					Packed canned										Totals	
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	cases		
																	cases	cases
1937†							66,583	3,022	84	1,738	1,354	15	11,242	87,897	20,934	193,469		
1938*		2,319	190	112			217,882	4,592	413	1,532	21,923	72	54,314	29,862	181,444	512,034		
1938†							169,430	3,754	32	508		13	28,687	63	49,835	252,322		
1939*	10	2,161	210				73,216	5,092	475	1,511	32,833	86	48,120	204,681	143,020	509,034		
1939†							43,294	4,466	448	1,094	8,428	69	17,144	108,608	42,480	225,986		
1940*	10	2,237	212				121,080	4,036	311	1,042	13,627	178	47,397	13,243	178,860	379,774		
1940†							86,215	3,411	279	770		144	12,369	12	40,056	143,256		
1941†	11	2,025	195				149,716	7,132	1,285	25,507		248	28,260	102,799	90,274	405,221		
1941*							196,871	8,290	1,425	26,396	18,466	315	91,571	179,071	360,623	883,028		
1942†	12	2,754	406				418,491	2,396	324	6,982		314	10,559	136	82,586	521,788		
1942*							474,035½	2,856	688	7,552	22,999½	314	34,004	9,075	264,736	816,260		
1943†	11	2,613	484				28,938	1,059½	237½	2,181½		246	8,391	30,394	53,954	125,401½		
1943*							72,507	1,393½	646½	2,852½	14,059½	291	38,747	162,495½	127,450	420,442½		
1944†	10	2,582	530				85,656½	607½	469	11,499	52	293	15,708½	130	13,875½	128,291		
1944*							107,431	1,172	947	12,196	12,303	332	46,928	33,756	50,421	265,486		
1945†	10	2,706	520				77,412½	723½	621	3,891½	44	204½	15,160	100,572½	28,615	227,244½		
1945*							123,384½	1,357½	1,195	5,437½	6,670	371½	60,536	285,351	117,044	601,347		

\* Represents actual pack, regardless where caught.

† Represents pack of Fraser fish, regardless where canned.

NOTE.—Licences issued include transfers from other districts. 1938† pack of Sockeye on Fraser, 164,408 cases, does not include 16,611 cases Sockeye caught on Fraser and exported and canned in Puget Sound canneries. 1940† pack of Sockeye on Fraser, 86,215 cases, does not include 4,536 cases Sockeye caught on Fraser and exported and canned in Puget Sound canneries. 1941: The above figures do not include packs of salmon canned in 1941 from Cold Storage stocks caught in 1940, particulars of which are given hereunder:

	Red Spring	Pink Spring	White Spring	Coho	Chums	Totals
1941 pack of 1940 catch.....	8	31	1,079	39,104	6,339	46,561

STATEMENT No. 6—PACK OF CANNED SALMON OF PUGET SOUND, U.S.A., FROM  
1937 to 1945

Year	Number of canneries operated	Spring	Sockeye	Coho	Chum	Pink	Steelhead	Total
		cases	cases	cases	cases	cases	cases	cases
1937.....	14	8,968	60,259	32,559	17,417	327,833		447,036
1938.....	13	2,787 <sup>1</sup> / <sub>2</sub>	134,651	9,820 <sup>1</sup> / <sub>2</sub>	7,852 <sup>1</sup> / <sub>2</sub>	193		155,304 <sup>1</sup> / <sub>2</sub>
1939.....	14	2,439	43,511	54,773	14,505	275,485		390,713
1940.....	9	1,991	63,890	30,478 <sup>1</sup> / <sub>2</sub>	21,618	2,732		120,718 <sup>1</sup> / <sub>2</sub>
1941.....	9	4,706	110,605	45,968	21,170	153,686		336,135
1942.....	10	1,460	263,458	6,582	3,896	710		276,106
1943.....	10	2,872	19,116	26,219	224	61,479		109,910
1944.....	3	1,178	37,509	475	15	306		39,483
1945.....	4	3,733	53,054	18,958	158	307,940		383,843

STATEMENT No. 7—STATEMENT OF HALIBUT LANDINGS—BRITISH COLUMBIA—  
1935-1945

(Includes landings in United States bottoms)

1935.....	171,143
1936.....	168,121
1937.....	187,425
1938.....	193,488
1939.....	227,188
1940.....	239,043
1941.....	229,658
1942.....	243,915
1943.....	250,034
1944.....	189,248
1945.....	194,763

\* Figures for earlier years may be found in the annual report for 1940-41.

## STATEMENT No. 8—CANNED PILCHARD PACK—BRITISH COLUMBIA—1935-1945

	Cases		Cases
1935.....	27,184	1940.....	59,166
1936.....	35,007	1941.....	58,038
1937.....	40,975	1942.....	46,451
1938.....	69,374	1943.....	101,356
1939.....	7,300	1944.....	94,164
		1945.....	78,854

NOTE.—For earlier figures see Departmental report for 1940-41.

STATEMENT No. 9—PRODUCTION FISH OIL AND MEAL—BRITISH COLUMBIA—  
1935-1945

Year	From Pilchards		From Herring		From Whales			From Other Sources*	
	Meal and fertilizers	Oil	Meal	Oil	Whale- bone and meal	Fertil- izer	Oil	Meal and fertilizer	Oil
	tons	gals.	tons	gals.	tons	tons	gals.	tons	gals.
1935....	8,681	1,649,392	5,262	306,767	211	354	426,772	2,147	247,437
1936....	8,715	1,217,097	10,985	782,499	332	687	763,740	3,148	335,969
1937....	8,483	1,707,276	14,427	1,283,658	268	527	662,355	2,720	294,546
1938....	8,891	2,195,850	9,624	929,158	273	490	543,378	2,491	228,157
1939....	906	178,305	16,462	1,366,607				3,004	283,504
1940....	4,853	877,556	24,264	1,700,819	181	434	361,620	3,526	285,314
1941....	10,473·2	1,789,708	8,757·5	584,157	271	577	566,505	5,081·6	390,939
1942....	11,550	1,622,840	10,898	643,577	130	205	255,556	4,837	263,481
1943....	15,456·4	2,233,281	7,126·5	675,002	62	90	134,553	2,315·9	156,808
1944....	10,278	1,962,040	8,832	889,213				1,675·25	131,507
1945....	5,939·8	1,161,564	12,976·45	1,122,432				1,676·8	159,603

\* Salmon and halibut offal, gray fish, and anchovies.



## STATEMENT No. 10—NUMBER OF WHALES LANDED—BRITISH COLUMBIA—1935-1945\*

Species	1935	1936	1937	1938	1940	1941	1942	1943
Sperm.....	175	311	265	252	126	233	130	69
Sulphur.....	6	3			2	1	1	
Fin.....	20	48	44	50	90	67	25	15
Hump.....	1	14	7	4	2	27	7	7
Sci.....		2						
Totals.....	202	378	317	310	220	328	163	91

\* No whaling plants operated in 1939, 1944 and 1945.

## STATEMENT No. 11—STATEMENT OF LICENCES ISSUED FOR SALMON CANNERIES AND SALMON FISHING GEAR (NOT INCLUDING LICENCES TO CAPTAINS AND ASSISTANTS ON SALMON SEINE-BOATS OR ASSISTANTS ON SALMON GILL-NET BOATS) BRITISH COLUMBIA—1935-1945

Kind of Licence	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
<i>District No. 1—</i>											
Salmon cannery.....	10	11	10	10	10	10	11	12	11	10	10
Salmon purse-seine.....	124	118	190	190	210	212	195	400	484	530	520
Salmon trollng.....	1,663	1,784	2,082	2,319	2,161	2,237	2,025	2,670	2,613	2,582	2,706
Salmon gill-net.....											
<i>District No. 2—</i>											
Salmon cannery.....	26	27	20	22	18	20	17	14	14	15	12
Salmon purse-seine.....	102	99	82	100	98	131	95	105	87	94	105
Salmon drag-seine.....	9	9	9	9	9	9	9	9	9	10	9
Salmon trolling.....	930	964	916	958	863	737	791	706	903	876	980
Salmon gill-net—											
Lowe Inlet.....	58	74	76	80	135	106	61	25	83	91	35
Naas River.....	310	349	321	309	289	254	281	170	199	186	158
Skeena River.....	1,053	970	856	1,049	844	926	981	765	749	725	787
Rivers Inlet.....	1,699	1,802	1,490	1,796	1,550	1,518	1,070	640	1,211	948	1,022
Smiths Inlet.....	324	408	385	465	267	378	285	107	238	142	145
Bella Coola.....	268	265	261	242	216	192	161	155	194	175	192
Butedale.....	41	57	18	80	102	148	78	3	88	72	76
Namu.....	129	146	137	159	148	134	93	109	89	81	96
Queen Charlotte Islands.....		24	4	53	9	14	8	42	8	34	11
Total, salmon gill-net, District No. 2.....	3,882	4,095	3,548	4,233	3,560	3,670	3,018	2,016	2,859	2,454	2,527
<i>District No. 3—</i>											
Salmon cannery.....	7	8	7	6	7	8	8	4	5	5	6
Salmon trap-net.....	8	7	5	5	5	5	5	5	5	5	5
Salmon purse-seine.....	191	188	209	200	241	219	238	207	203	199	207
Salmon drag-seine.....											
Salmon trolling.....	2,053	2,429	2,056	2,305	2,874	2,273	2,094	2,737	2,959	3,077	3,264
Salmon gill-net.....	673	741	466	573	781	485	459	567	571	390	418
<i>Whole Province—</i>											
Salmon cannery.....	43	46	37	38	35	38	36	30	30	30	29
Salmon trap-net.....	8	7	5	5	5	5	5	5	5	5	5
Salmon purse-seine.....	293	287	291	300	339	350	333	312	290	295	312
Salmon drag-seine.....	9	9	9	9	9	9	9	9	9	10	9
Salmon trolling.....	3,107	3,511	3,162	3,453	3,947	3,222	3,080	3,843	4,346	4,483	4,764
Salmon gill-net.....	6,218	6,620	6,096	7,125	6,502	6,392	5,052	5,253	6,043	5,426	5,646

Note.—Salmon cannery licences shown above were issued by the Provincial Fisheries Department.

## STATEMENT No. 12—PACK OF SOCKEYE SALMON FROM RUNS TO FRASER RIVER, 1935-1945

Year	Fraser River Pack	Canadian Traps in Juan de Fuca Straits	Puget Sound Pack	Total Cases*
1935.....	57,212	5,610	54,677	117,499
1936.....	164,408	3,837	59,505	227,750
1937.....	66,583	6,152	60,259	132,994
1938.....	169,430	3,784	139,173	312,387
1939.....	43,249	4,290	43,511	91,050
1940.....	86,215	2,247	63,890	152,352
1941.....	149,715½	9,563	110,605	269,883½
1942.....	418,491	8,488	263,458	690,437
1943.....	28,938	1,339	19,116	49,393
1944.....	85,656½	2,494	37,509	125,659½
1945.....	77,412½	2,369	53,054	132,835½

\* Figures represent pack of Fraser River sockeye, regardless where canned.

STATEMENT No. 13—STATEMENT OF FISHERY LICENCES—BRITISH COLUMBIA  
JANUARY-DECEMBER 1945

Variety of Licence	ISSUED				TRANSFERS			OPERATING					
	Whites	Indians	Chinese	Cancelled	Total	Whites	Indians	Total	Whites	Indians	Chinese	Cancelled	Total
Salmon Trap-net.....	5	9			5				5	9			5
Salmon Drag-seine.....	267	40		4	311				267	40			312
Salmon Purse-seine.....	3,621	1,286	1	3	4,911	603	132	735	4,294	1,418	1	5	5,646
Salmon Gill-net.....	4,047	661	3	1	4,712	51	1	52	4,098	662	3	1	4,764
Salmon Trolling.....	343	90	333		433	15	2	17	358	102			450
Asst. Salmon Gill-net.....	112	118			230				118	118			230
Capt. Salmon Purse-seine.....	945	636			1,584				945	636			1,581
Cod.....	1,172	154	2		1,328	2		2	1,174	154	2		1,330
Gray fish.....	2,026	135	4		2,165	5	5		2,031	135	4		2,170
Crab.....	134				134				134				134
Miscellaneous.....	249	32	2		283				249	32	2		283
Small Dragger.....	101	2		1	104	3		3	104	2		1	107
Smelt.....	48				48				48				48
Capt. Halibut or Black Cod.....	346	235			581				346	235			581
Capt. Halibut for Bait.....	12				12				12				12
Herring Purse-seine.....	63	4		1	68				63	4		1	68
Capt. Herring Purse-seine.....	43	10			53	43	10		43	10			53
Asst. Herring Purse-seine.....	330	89			419				330	89			419
Herring Gill-net.....	18				18				18				18
Herring Pound.....	9				9				9				9
Pilchard Purse-seine.....	25				29				25				29
Capt. Pilchard Purse-seine.....	21	2	4		27				21			4	29
Asst. Pilchard Purse-seine.....	176	14			190				176	14			190
Capt. Tuna Boat.....	75				75				75				75
Asst. Tuna Boat.....	133				133				133				133
Abalone.....	2	88	1		91				2	88	1		91
Totals.....	14,323	3,605	13	15	17,958	679	135	814	15,002	3,740	13	15	18,770

Indian Permits: 1,406 (1 cancelled and 1 used as a specimen).

*Licences issued by Provincial Fisheries Department, 1945 Season:* Salmon cannery, 29; herring cannery, 22; pilchard cannery, 6; shellfish cannery, 8; herring reduction, 11; pilchard reduction, 6; dogfish reduction, 3; fish liver reduction, 10; fish offal reduction, 9; tierced salmon plants, 8; pickled herring plants, 10; cold storage plants, 13; fish-buyers' licences, 458; non-tidal fishing licences, 109; sturgeon, 1; herring saltery plant, 1; oulachon saltery plant, 1.

STATEMENT No. 14—STATEMENT OF DIFFERENT SPECIES OF SALMON AND METHOD OF CAPTURE REPORTED BY OPERATORS OF SALMON PURSE-SEINES, DRAG-SEINES AND TRAP-NETS AND BY SALMON CANNING, CURING AND COLD STORAGE ESTABLISHMENTS, OF GILL-NET AND TROLL CAUGHT FISH—BRITISH COLUMBIA—SEASON 1945.

Method of Capture	Sockeye	Springs	Blue-backs	Steel-heads	Cohoe	Pink	Chums	Totals
Troll.....	1,663	199,727	391,000	248	1,214,328	178,128	42,054	2,027,148
Gill-net.....	3,493,709	264,714	.....	32,971	868,756	5,245,491	842,452	10,748,093
Purse-seine.....	210,859	6,465	144	684	331,072	8,795,736	2,074,895	11,419,855
Drag-seine.....	33,373	.....	.....	.....	14,217	12,857	3,309	63,756
Trap-net.....	31,879	31,224	.....	1,807	55,115	221,871	2,179	344,075
Totals.....	3,771,483	502,130	391,144	35,710	2,483,488	14,454,083	2,964,889	24,602,927

STATEMENT No. 15—STATEMENT OF NUMBER OF SALMON CAUGHT BY PURSE-SEINES, SHOWN BY SEINING AREAS BRITISH COLUMBIA—SEASON 1945

Area	Sockeye	Springs	Blue-backs	Steel-heads	Cohoe	Pink	Chums	Totals
1.....	241	.....	.....	.....	464	6,697	13,850	21,252
2.....	9	.....	.....	.....	4,030	33,915	69,456	107,410
3.....	264	.....	.....	1	1,619	181,330	8,401	191,615
4.....	761	11	.....	27	699	34,559	8,470	44,527
5.....	6,236	33	.....	11	17,468	1,005,728	33,707	1,063,183
6.....	33,599	543	.....	72	46,338	2,270,871	304,642	2,656,065
7.....	6,352	116	.....	246	12,374	929,693	99,218	1,047,999
8.....	3,294	97	.....	129	6,431	815,072	47,686	872,709
9.....	350	10	.....	.....	2,198	83,368	53,399	139,325
10.....	.....	.....	.....	.....	1,258	381	7,672	9,311
11.....	.....	.....	.....	.....	6,675	2	35,606	42,283
12.....	135,648	3,859	.....	119	115,672	2,597,154	670,182	3,522,634
13.....	19,338	1,380	88	35	42,722	745,987	469,052	1,278,602
14.....	.....	235	.....	.....	3,714	2	64,115	68,066
15.....	.....	.....	.....	.....	1,546	.....	10,103	11,649
16.....	2	1	.....	.....	1,992	267	17,689	19,951
17.....	647	21	.....	43	1,829	88,244	16,948	107,732
18.....	.....	.....	.....	.....	35	2,378	650	3,063
19.....	.....	.....	.....	.....	.....	.....	.....	.....
20.....	.....	.....	.....	.....	240	.....	766	1,006
21.....	3	9	.....	.....	10,211	84	3,765	14,072
22.....	.....	.....	.....	.....	368	.....	1,859	2,227
23.....	395	149	56	1	12,685	.....	34,466	47,752
24.....	3,720	.....	.....	.....	13,560	.....	26,704	43,984
25.....	.....	.....	.....	.....	12,865	.....	50,499	63,364
26.....	.....	.....	.....	.....	5,494	.....	15,272	20,766
27.....	.....	1	.....	.....	8,585	4	10,718	19,308
Totals....	210,859	6,465	144	684	331,072	8,795,736	2,074,895	11,419,855

## DEPARTMENT OF FISHERIES

STATEMENT No. 16—STATEMENT SHOWING PACKS OF CANNED SALMON, 1935-1945  
WITH QUANTITIES GRADED SECOND QUALITY AND PERCENTAGES

—	Sockeye	Spring	Steel-head	Blue-back	Coho	Pink	Chum	Total
1935 Pack cases...	350,444	21,920	596	15,319	216,173	514,966	409,604	1,529,022
Grade B, cases...	3,435	659			3,840	20,528	5,601	34,063
Per cent. ....	.980	3.006			1.776	3.986	1.367	2.227
1936 Pack, cases...	415,024	29,854	1,068	33,718	212,343	591,532	597,487	1,881,026
Grade B, cases...	13,725				483	29	5,265	19,502
Per cent. ....	3.307				.227	.005	.881	1.036
1937 Pack, cases...	325,774	16,171	844	19,236	113,972	585,576	447,602	1,509,175
Grade B, cases...	65				68	27,282	3,212	30,627
Per cent. ....	.019				.059	4.659	.717	2.029
1938 Pack, cases...	447,453	15,531	1,035	27,417	273,906	400,876	541,812	1,707,830
Grade B, cases...	16,361			56½	1,111	1,413	1,583	20,524½
Per cent. ....	3.656			.206	.405	.352	.292	1.201
1939 Pack, cases...	269,888	16,097	797	48,209	196,887	620,595	386,584	1,539,057
Grade B, cases...	3,444½	11	20	17	142½	45,667	1,068	50,370
Per cent. ....	1.276	.068	2.509	.035	.072	7.358	.276	3.272
1940 Pack, cases...	366,403	17,741	1,205	23,277	201,467	213,911	643,443	1,467,227
Grade B, cases...	1,778½	57		13	461	2,530	3,298½	8,138
Per cent. ....	.485	.321		.054	.228	1.182	.512	.554
1941 Pack, cases...	445,297	50,476	3,454	30,027	361,380	427,766	920,470	2,248,870
Grade B, cases...	1,186½	152½	2	33	539½	64,866	25,161½	91,941
Per cent. ....	0.260	0.301	0.057	0.109	0.149	15.163	2.733	4.088
1942 Pack, cases...	666,571½	24,744½	4,649	23,265½	187,873½	270,622½	633,834	1,811,560½
Grade B, cases...	39,753½	256		87	693½	8,676	17,654	67,120
Per cent. ....	5.963	1.034		0.373	0.369	3.205	2.785	3.705
1943 Pack, cases...	164,889	10,658	3,095	14,059½	171,983	530,188½	363,347½	1,258,221½
Grade B, cases...	227½	69			3	25,837½	7,823	34,760
Per cent. ....	.137	.647			.002	4.873	2.153	2.762
1944 Pack, cases...	247,714	19,362	3,926½	12,464	169,082½	389,692	255,316½	1,097,557½
Grade B, cases...	723	101	11		86	2,777	1,238½	4,927
Per cent. ....	0.292	0.521	0.038		0.050	0.712	0.485	0.448
1945 Pack, cases...	329,901½	12,800	2,922	6,670	212,217	825,512½	350,188	1,739,311
Grade B, cases...	163	99			30	75,284½	4,474	80,050½
Per cent. ....	0.049	0.773			0.014	9.119	1.277	4.602

STATEMENT No. 17—RECAPITULATION OF FISH LIVER AND FISH VISCERA  
SUMMARIES—1945

Species	Purchases		In Cold Storage		Liver Oil		Total Value Marketed or Prepared for Market
	Pounds	Value to Fishermen	Pounds	Value	Pounds	Value	
		\$		\$		\$	
Gray Cod Livers.....	25,949	1,752	2,809	218	3,032	764	982
Black Cod Livers.....	43,275	60,013	1,919	2,782	7,052	64,323	67,105
Black Cod Viscera.....	49,342	13,849	9,416	1,880	2,489	16,323	18,203
Ling Cod Livers.....	155,472	282,943	24,338	53,375	19,173	232,493	285,868
Ling Cod Viscera.....	139,389	11,174	12,620	1,224	15,745	8,184	9,408
Red Cod Livers.....	40,123	32,661	2,504	2,922	5,405	30,886	33,808
Red Cod Viscera.....	13	1					
Halibut Livers.....	232,979	185,544	12,608	6,308	24,058	182,597	188,905
Halibut Viscera.....	324,706	59,000	18,699	3,739	9,299	59,865	63,604
Skate Livers.....	3,672	111			2,092	216	216
Sole Livers.....	507	150			106	318	318
Grayfish Livers.....	5,821,849	1,833,210	39,576	10,364	3,880,423	2,337,267	2,347,631
Soupfin Shark Livers.....	35,341	140,103	1,887	6,548	20,967	162,154	168,702
Ratfish Livers.....	41,261	1,684	2,520	126	26,668	2,695	2,821
Mudshark Livers.....	84,268	19,624			40,092	23,506	23,506
Miscellaneous Shark Liver...	13,112	1,049	16	2	8,825	2,227	2,229
Mixed Cod Viscera.....	3,144	1,870			900	2,138	2,138
Turbot Livers.....	77	58			39	67	67
Scrapfish Livers.....	42,843	2,142	2,449	1,225	29,276	2,152	3,377
Mixed Liver Oil.....					2,264	6,372	6,372
Total values.....		2,646,938		90,713		3,134,547	3,225,260



## SALMON SPAWNING REPORT, 1945

*Sockeye*.—Very satisfactory supplies of parent sockeye were found in the more important areas such as the Naas, Skeena, Rivers Inlet and Smiths Inlet. This was true also in the most northerly portions of the Fraser River watershed, such as Stuart Lake-Francois Lake systems. The Chilco system was reasonably well seeded, although the supplies were some 43 per cent less than in the brood year, 1941. In the Shuswap-Adams River system, where only a small return was expected, some 6,000 parent four-year-old sockeye were observed, and 56,000 three-year-olds.

Fraser River sockeye are predominantly four-year fish, so, obviously, it would require four or five cycles to show any appreciable increase as a result of the unusual conservation measures which were put into effect by the Department. Now, after 25 years of such effort for the restoration of the sockeye runs, most encouraging results are being obtained: for instance, in the Shuswap-Adams River district, where the run of one cycle particularly has been built up from 70,000 to over 2,000,000 fish; in the Chilco area where two at least of the cycles have been built up from 3,000 or 5,000 parent fish on the spawning grounds to 350,000; and in the Stuart Lake-Francois Lake system where the increases have been also very encouraging. With this very considerable increase in the sockeye runs, coupled with the assurance of easy passage at Hell's Gate due to the completion this year of very efficient facilities in the way of fishways which should in due time be a large factor in the building up of the Fraser River sockeye run to the areas above Hell's Gate, the picture is a very promising one. If conservation measures such as have been enforced during the last 25 years in the Fraser River system can build up the runs as they have done, there seems little doubt but that with the passage at Hell's Gate being made easy the areas above Hell's Gate should in time be restored to their original state of productivity.

*Springs*.—The supplies of this variety were reasonably satisfactory.

*Coho*s.—Excellent supplies of cohoes were found on the spawning beds, particularly in the Queen Charlotte, Naas, Alert Bay, and Comox areas, and the areas on the west coast of Vancouver Island.

*Pinks*.—A heavy seeding by pink salmon occurred in the Naas, Skeena, Grenville-Prince, Bella Coola, Bella Bella, Alert Bay, Quathiaski, Comox, and Fraser River systems.

*Chums*.—The chum seeding was not as satisfactory as there was reason to expect. The exceptions were several streams of the Naas area, the Bella Bella and Alert Bay areas.

## CONDITIONS IN DETAIL

*Queen Charlotte Islands Area—North*

A heavy seeding by cohoes occurred in the streams tributary to Massett Inlet and on the west coast of Graham Island. This was an "off" year for the pink variety. The supply of chums was medium. Unusual conservation measures were taken to permit a larger percentage of the chum run to escape to the spawning grounds.

*Queen Charlotte Islands Area—South*

Coho seeding was heavy in the streams tributary to Skidegate, Cumshewa and Selwyn Inlets, and the lower East Coast and West Coast. The chum seeding was fair in the Skidegate Inlet area, light in Cumshewa Inlet, only fair at Selwyn Inlet, and fair in the lower East coast streams with the exception of Salmon

Creek, which had a heavy seeding. Only a light seeding occurred in the streams tributary to the West coast. Extra conservation measures were enforced in the South Queen Charlotte area, as well, in order to protect the chum runs.

#### *Naas Area*

Sockeye were found in very satisfactory quantities on the principal spawning grounds of this area, that is, the Meziaden Lake district. The spring supplies were found quite good in the several streams tributary to the lower Naas. A heavy seeding by cohoes occurred and an unexpectedly heavy supply of pinks was observed. The chum seeding in Toon and Kitsault rivers was reported as heavy but only light in other parts of the area. The percentage of escapement was much greater than normal, due to less intensive fishing in the approaches to the Naas River.

#### *Upper Skeena Area*

*Sockeye.*—The inspecting officer stresses the extremely heavy escapement of this variety to the Babine Lake portion of the watershed, and the large size of the fish, individually. Unfortunately, due to an unusually dry season, the streams in many cases were so low that the loss of salmon, unspawned, amounted to as high as from 25 to 50 per cent of the escapement. Practically all sockeye streams received good escapements of parent fish, although the seeding, due to the above mentioned cause, was not as good as it should have been. Outstanding streams from the standpoint of good escapement were Fulton River, Pierre Creek, Twin Creek, Fifteen Mile Creek, Tacheek Creek, Nine Mile Creek, Morrison Creek, and both upper and lower Babine River; in fact, practically all streams tributary to Babine Lake, including the Babine River, received heavy supplies of sockeye salmon. An interesting feature was the fact that the take by the local Indians for their food supply was 25 per cent less than the total of the previous year.

The heavy run of sockeye reported as passing Moricetown Falls during the season undoubtedly provided a satisfactory seeding of the Morice Lake and River spawning grounds. This escapement was good, notwithstanding the fact that the Indians obtained a larger number of fish at the falls than usual. This is confirmed by the observations of the inspecting officer at the Nanika River. An attempt was made at a later examination of the streams in the Morice River-Lake watershed, by means of a 'plane, but this effort did not produce the results desired, although the inspecting officer reports that he is of the opinion that the area has been adequately seeded by sockeye. The seeding by springs in the Babine area compares favourably with that of other recent years. A satisfactory seeding was observed in the Bulkley River-Morice Lake system. The supplies of coho in the Babine area were quite satisfactory. The seeding by pinks in the Babine River was heavy and compared favourably with that of the brood year of 1943, although the fish, individually, were smaller in size.

#### *Lower Skeena Area*

A heavy run of sockeye was observed to Williams Creek, the main spawning stream in the Lakelse Lake system; an improvement over that of the cycle year. A fairly heavy run was seen at Schullabuchan Creek; medium supplies were found in the Kalum Lake area, somewhat less than the seeding of 1941. Satisfactory supplies in the Oestahl River system. A good seeding by spring salmon at Johnson Creek in the Oestahl River system, and a heavy run to Cedar River and Clear Creek. A good seeding by coho salmon in the tributaries to the Skeena, and the Oestahl River and tributaries. Pinks were abundant in all the spawning beds of this area, the supply at Lakelse River being particularly heavy, as was the case at the Oestahl River and tributaries.

*Lowe Inlet Area*

A reasonably good run, together with a reduction in the intensity of fishing, due partly to conservation measures, provided a satisfactory seeding of sockeye in this area. Coho supplies appeared to be satisfactory, although the streams were so high that it was difficult to make an accurate estimate. All pink streams in the southern portion of this area were well seeded. Due to special closure of fishing for conservation purposes the seeding of the northern streams was satisfactory. The chum supplies were only fair.

*Butedale Area*

A good seeding of sockeye salmon was reported in the Gardner Canal area. In other parts of the district the seeding was fairly good. The coho supplies were quite good, particularly in the Gardner Canal system. Coho supplies appear to be building up. A heavy seeding by pinks throughout the whole area. The run in this odd-year cycle now exceeds that of the even-year cycle. A heavy seeding by chums, particularly in the streams tributary to Kynoch Inlet, Poison Cove, Kiltinsh River, and Price Creek.

*Bella Bella Area*

The sockeye supplies were entirely satisfactory for this area. There was a good late run to the Ellerslie district. The coho seeding was also satisfactory on all spawning grounds. The pink supplies were generally heavy, but late to many of the streams. Nearly all chum spawning areas contained heavy supplies, particularly the Roscoe Inlet area. With the exception of a few minor instances, parent salmon had no difficulty this year through lack of water.

*Bella Coola Area*

The sockeye seeding is reported as definitely heavy, especially to the Bella Coola-Atnarko River watershed. Spring supplies were also very satisfactory at such areas as Kimsquit, Dean, and Bella Coola rivers. A medium to heavy spawning of cohoes was observed. The pink seeding was exceptionally heavy in most streams. In the brood year of 1943 most of the heavy spawning occurred in the Bella Coola-Atnarko River area; this season nearly all streams carried above average supplies, particularly the Quatna, Elcho, and Cliff rivers. The supplies of chums were only medium.

*Rivers Inlet Area*

The sockeye supplies in the streams tributary to Owekano Lake were found to be very good and an improvement over the brood years of 1940 and 1941. All rivers were found to be well seeded, with the possible exception of the Askum, although there is no reason to believe that even in that stream there was not a reasonably good seeding. Conditions in the main streams, such as the Waukwash, Shumahalt, Genesee, Quap, and Whonnock rivers were very satisfactory. Notwithstanding a good catch commercially, the whole area undoubtedly has been well seeded.

Changed conditions in several streams, such as the Markwell, for instance, require the attention of an engineer, and this is being arranged for in ample time to have conditions corrected before the next salmon run.

The inspecting officer, in connection with the sockeye run to the Rivers Inlet area, comments in part as follows: "The mathematical expected weight of the commercial takings of this year's run of sockeye was computed at 5.5 lbs. by the writer. The actual average weight of sockeye taken commercially over the entire season was only 5.16 lbs. During the commercial run this occasioned



some anxiety to the writer. I now have to report that all the sockeye seen on the entire spawning beds of Owekano Lake 50 per cent were large sockeye. Sockeye were seen in many rivers, both dead and alive, which I am satisfied could never be gilled in the size of mesh used in commercial gillnets in Rivers Inlet. The *heaviest* weight recorded by the inspecting party showed to be 13 lbs. This was exceptional, but many were 8, 9, and 10 lbs., and in quantity dead and wasted sockeye of 8 lbs. were found on the bars. This fact, witnessed and observed by the representatives of the industry, verifies my report of 1940 being a good escapement. I sensed, and still believe, that the industry as a whole doubted the accuracy of my 1940 report, following a not very successful commercial run. It was some personal satisfaction to have these representatives of the industry present this year and see the ratio of escapement which very apparently was derived from 1940."

A good supply of cohoes was found on the spawning grounds, and fairly heavy supplies of pinks, although this variety was not fished to any great extent. The chum seeding was excellent.

#### *Smiths Inlet Area*

The sockeye seeding is reported as good. The comment of the inspecting officer is that it was the best he had seen in his 13 years of experience at this point. In the Geluck River, which is the main spawning stream, sockeye were found on every bar and the pools of the river still held numbers not yet ready to spread out on the bars. The conditions at Delabah River, the second most important stream, were good. The coho supplies were satisfactory. The pink spawning in Nekite River was heavy, and the chum supplies were good.

The moving of the boundary at the commencement of the season to permit of larger escapement evidently produced the expected results.

The Department's inspecting officer was accompanied by representatives of the fishermen and the operators on this year's survey of both Rivers and Smiths Inlet areas. Their presence was very welcome and it is hoped that such evidence of the interest of the industry will be continued.

#### *Fraser River Watershed*

*Prince George Area*—The seeding over the whole area again demonstrates the gradual building up of the supplies of sockeye and shows a very satisfactory increase over the cycle year, 1941. With the increased supplies of parent stock on the spawning grounds future runs should build up more rapidly, particularly in view of the excellent conditions now obtaining at Hell's Gate, due to the completion this year of very efficient fishways. Sockeye reaching the Stuart Lake and Fraser-Francois Lake watersheds during the year approximated 80,000 fish, compared with 18,000 in the brood year of 1941. Conditions on the spawning grounds were satisfactory. The inspecting officer comments on the fresh condition of the sockeye arriving which shows that they were evidently not delayed on their way to the spawning grounds. The supplies of springs were again light this year, although better than in the last two years.

*Quesnel Area*—The main sockeye spawning streams here are the Chilcotin River and Lake system, the Bowron River and Lake system, and the Quesnel River and Lake system. The Chilcotin spawning showed a decrease of approximately 43 per cent from that of the brood year of 1941, the number on the spawning grounds being estimated at 200,000 fish, compared with 350,000 in the brood year. The seeding, however, was felt to be reasonably satisfactory, and in the light of experience in this area there is every reason to expect increased runs in the future, particularly when the main obstructions are removed from the rivers.



It is encouraging to observe that the cycle represented by the year 1945, similar to that represented by the year 1941, is building up most satisfactorily. From an estimated spawning stock of 3,000 parent fish in 1925 in the Chilco system, the following increased supplies were observed:

1929	70,000
1933	100,000
1937	110,000
1941	350,000

The salmon in these years are reported to have arrived in good condition.

In the Bowron system 4,000 fish were counted compared with 1,100 in the previous brood year. In the Quesnel system the number estimated was 2,500, compared with 1,000 in the brood year. The inspecting officer states that this is the best showing for the past 10 years. Spring salmon were on the spawning grounds in average numbers.

*Kamloops Area*—It is estimated that approximately 6,000 four-year-old sockeye were present on the spawning grounds of the Shuswap system, and over 56,000 three-year-olds. This, of course, is a great improvement over the brood year of 1941 when very few fish were present. The particular areas heavily populated in the year under review were the Adams River and Little River especially, and Scotch Creek. In Raft River, North Thompson system, it is estimated that over 3,000 parent sockeye were on the spawning grounds. This was a great improvement over conditions found in 1941. The inspecting officer comments on the splendid physical condition of the spawning salmon. Considerable improvement in the spawning of spring and coho salmon was observed, throughout the Kamloops area.

*Pemberton Area*—Heavy sockeye seeding took place, especially in the Birkenhead River, the most important stream of the system, where it is estimated that 80,000 sockeye were present, compared with 50,000 in the brood year, 1941. Some 500 spawned in the Seton Lake system. Fair supplies of springs were observed throughout the whole system, particularly in the Squamish River and tributaries. Satisfactory supplies were also found in Tyaughton Creek in the Bridge River area. The coho seeding was satisfactory, particularly in the Birkenhead and Upper Lillooet rivers, and at Gates Creek in the Anderson-Seton Lake system. In the Squamish River and tributaries the supplies were normal. The pink seeding in the Squamish River system was heavier than in the brood year of 1943, although not equal to conditions obtaining in some former years. The supplies were adequate. The chum supplies did not equal those of 1941 or 1942. However, the inspecting officer estimates that there was a reasonably good seeding.

*Chilliwack Area*—No sockeye were observed in the Chilliwack River, above Sweltzer Creek, and the Cultus Lake seeding is reported as being light, some 9,300 parent fish being counted. The seeding by springs was also light. The coho seeding is reported as just fair with the exception of the upper portion of the Chilliwack system, which was well seeded. The pink seeding was particularly heavy, in most of the streams frequented by this variety. This applies particularly to the Chilliwack and Coquihalla rivers, and the Jones and Silver Creek systems. The chum seeding was an average one, although below expectations in the Coquihalla system. As these fish arrived after the heavy rains, the results will no doubt be more satisfactory than in the case of other varieties which have been affected to some extent by flood water conditions.

*Harrison Area*—Excellent supplies of spawning sockeye were observed on the beds at Morris Creek. A satisfactory seeding occurred also at Harrison River Rapids and at Silver Creek. The seeding by springs can be considered only fair. This also applies to cohoes. Pinks spawned in very considerable quantities, particularly at Morris Creek and Chehalis River. The chum seeding was only fair.

*Pitt Lake Area*—A good seeding of sockeye occurred, under favourable conditions, in the tributaries to the upper Pitt River, particularly Four Mile, Seven Mile, and Boise creeks. Fair supplies of cohoes were observed. A good seeding by pinks in the Alouette River watershed, and fair in the streams tributary to Pitt Lake. A satisfactory seeding by chums in the Alouette River watershed.

*Lower Fraser Area*—A light seeding of cohoes in the Coquitlam and Brunett rivers, but a better showing in the Serpentine and Nicomekl rivers. Very satisfactory supplies of pinks in the Coquitlam and the other streams usually frequented by this species. Chum supplies were fairly satisfactory, as compared with those in recent years, in the Coquitlam River and the several other streams frequented by these fish.

*North Vancouver Area*—A very good seeding of cohoes occurred in the Capilano and Seymour rivers. Smaller supplies were observed in the Indian River, Lynn, Mission, and McKay creeks. The seeding by pinks in the Capilano, Seymour River, and Lynn Creek systems was very light, but very heavy seeding in the Indian River system. The chum seeding in the Capilano and Seymour River, and Lynn Creek systems was light, and only fair in Indian River and Nelson Creek.

#### *Alert Bay Area*

There were excellent escapements of sockeye to the spawning grounds of the Nimpkish River, normal runs to Keough, McKenzie, Fulmore, and Quatse rivers, and some increase at Kahweiken and Kléna-Kléne rivers. An average seeding of springs occurred, with the Nimpkish River showing a slight increase over 1939. There was a heavy seeding of cohoes in the mainland streams, estimated at 50 per cent greater than in the brood year. The streams on the Vancouver Island shore contained medium supplies. The pink seeding in the streams on the mainland side was the heaviest in the past 12 years. On the Vancouver Island shore, however, with the exception of Klicksevi River, the seeding was light. Most satisfactory chum spawning conditions prevailed throughout the whole area, with a few exceptions.

#### *Quathiaski Area*

A very good seeding of sockeye in Phillips River and at Hayden Bay was observed. This also applies to the spring variety in Campbell River. Other streams in the district were adequately seeded by springs. The coho supplies were found to be reasonably good, although somewhat less than those of the brood year. Notwithstanding this being the "off" year for pinks, a heavy seeding was observed in the Bute Inlet area, and an unexpectedly good seeding of Bear River. The chum seeding was not satisfactory. All streams in this area suffered from lack of water during the salmon runs.

#### *Comox Area*

The seeding by springs was quite satisfactory. Coho seeding showed an improvement over the brood year, in Oyster River and Courtenay River. The conditions in the Qualicum, French Creek, and Englishman's River were disappointing. The pink seeding was extremely heavy in the Courtenay River system, particularly the Tsolum River. The supplies in the other streams of the area were light. The chum seeding was reasonably good, except in French Creek and Englishman's River. In most of the streams in the Comox area there may have been some loss of salmon eggs due to heavy freshets.

#### *Pender Harbour Area*

A sockeye seeding comparable with that of the brood year was observed at Saginaw Creek, which is the main sockeye stream in this area. A normal supply of springs was observed. There was a satisfactory seeding by cohoes, and a

heavy supply of pinks in all the main pink streams. The inspecting officer comments that the supplies in Toba Inlet area were the greatest in the past twelve years. The chum seeding was satisfactory.

#### *Nanaimo Area*

Sockeye and pinks do not frequent this area in commercial quantities. A satisfactory seeding of coho took place, as was also the case with the chum variety.

#### *Ladysmith Area*

An average seeding of springs and a heavy supply of cohoes on the spawning grounds. The spawning by chums was good, under favourable conditions.

#### *Cowichan Area*

The seeding by springs was fairly good. The supply of cohoes was very good in the Cowichan River and a satisfactory supply was observed in the Koksilah River. It is expected that the recent work by the Department at the falls in the latter stream will result in larger supplies in future proceeding to the extensive spawning grounds which have now been made accessible to the salmon. The chum seeding was disappointing at the date of inspection but further supplies were still arriving and there is reason to believe that the conditions with this variety would be reasonably satisfactory. The supply of steelhead trout apparently is being maintained.

#### *Victoria Area*

The coho seeding was disappointing and the chum supplies on the spawning beds were only fairly satisfactory.

#### *Alberni Area*

The sockeye seeding of the Somass, Sproat, and Anderson Lake systems is reported as very satisfactory. The number of fish counted through Stamp Falls fishway was the largest on record. In addition, of course, there would be the usual natural escapement over the falls. The salmon had no difficulty in passing over the low dam at the outlet of Great Central Lake. An adequate escapement was also observed in the Hobarton River. With the exception of Nitinat River, all streams frequented by springs have been adequately seeded. The coho seeding is reported as being exceptionally good in all the rivers of this sub-district. The chum supplies were again disappointing over the whole area, although several of the streams showed an improvement over the previous year.

#### *Clayoquot Area*

The sockeye spawning beds in the Kennedy Lake area, which is the chief spawning system for this variety, were found to be splendidly seeded; an increase over the brood year of 1941. The sockeye seeding at Megin River, a somewhat less important system than Kennedy Lake, is reported as the heaviest in the past 10 years. A heavy seeding by spring occurred throughout this sub-district. A heavy seeding by cohoes was also observed on all the spawning grounds. The supply of chums was only fair.

#### *Nootka Area*

Not a commercial sockeye area. The seeding by springs and cohoes is considered normal. With the exception of Tasis River, the spawning of chums is reported as almost a failure.



*Kyuquot Area*

A very satisfactory seeding of cohoes is reported, particularly in the Tashish, Artlish, and Kaouk rivers. Whilst the chum supply showed improvement over that of the last two seasons, it was still not as good as expected. There was little commercial fishing, however, and most of the run passed safely to the spawning grounds.

*Quatsino Area*

Whilst this is not a large producer of sockeye salmon, there was a good seeding at Mahatta River, and the average showing in Macjach and Fisherman's rivers. A good average supply of springs, in Marble Creek, which is the chief spawning area for them, was observed but conditions in the Klashkish River and East Creek were not so satisfactory. Water conditions in Marble Creek were good during the entire season. The coho supplies were above average, the escapement being heavy at Buck Creek, Spruce, Rupert, Mahatta, and Fisherman's rivers. This was the "off" year for pinks. The chum supply was disappointing throughout the whole sub-district. Spawning conditions, due to low water up to October 15th, were unsatisfactory.

## APPENDIX No. 2.

**REPORT OF CHIEF SUPERVISOR OF FISHERIES  
(COLONEL A. L. BARRY) EASTERN DIVISION, 1945**

Figures contained in this report pertaining to catches and values are approximate only since final statistics for 1945 are not complete at the time of writing. The figures are to be taken as subject to revision, although it is not expected that revision will change them significantly.

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The total quantity of fish and shellfish landed in the division during 1945 amounted to over 600 million pounds, showing an increase of more than 62 millions when compared with 1944. Value to the fishermen increased by approximately \$5,000,000, and the value as marketed by approximately \$9,000,000.

## THE COD FISHERY

Cod landings increased by approximately 40 million pounds when compared with last year. A large increase occurred in Nova Scotia landings, and a proportionately large increase in Prince Edward Island. The New Brunswick catch decreased by about one-half million pounds.

## THE LOBSTER FISHERY

The catch of lobsters increased by over three and one-half million pounds. The Nova Scotia and the Prince Edward Island catches show increases of over one and one-half million pounds while the catch for New Brunswick increased by slightly less than one-half million pounds. The total quantity of all lobsters caught in this division was approximately thirty-four and one-half million pounds.

## THE SARDINE FISHERY

The sardine fishery, which is confined to the Bay of Fundy section, shows a marked decrease in landings. Total landings this year were approximately 47 million pounds as compared with approximately 82 million pounds in 1944.



## THE HADDOCK FISHERY

An increase of approximately six million pounds occurred in the haddock catch. The Nova Scotia catch accounted for the greater part of the increase although increases also occurred in New Brunswick and Prince Edward Island.

## OTHER FISHERIES

The other principal varieties taken during the year were pollock, halibut, herring, mackerel, swordfish, salmon, hake, clams, oysters and scallops.

*Nova Scotia*

The catch in Nova Scotia reached a new "high" of over 419 million pounds. The largest single increase was in the catch of cod, where the increase amounted to over 38 million pounds. Other varieties showing increases were lobsters, haddock, herring, mackerel, swordfish, pollock, scallops and hake. Decreases occurred in the catches of halibut, salmon and smelts. The total catch for the Cape Breton Island section increased by over 14 million pounds, while an increase of approximately 25 million pounds occurred in the eastern mainland section, and an increase of nearly 35 million pounds in the western mainland section.

The total landed value of all fish landed in the province during the year was approximately \$19,000,000, while the total value of the catch as marketed rose to approximately \$30,000,000.

The following table gives a statement of the total catch, landed and marketed values for the province, as well as similar information concerning the principal varieties:

1945	
Total quantity of all fish landed .....	419,491,600 pounds
Total landed value .....	\$ 19,155,571
Total marketed value .....	\$ 30,549,968

	Pounds	Landed Value \$	Marketed Value \$
Cod .....	204,773,300	7,186,086	13,051,006
Lobsters .....	18,894,500	5,838,521	5,927,348
Haddock .....	31,161,100	1,409,199	2,209,518
Herring .....	54,373,700	732,962	1,828,957
Mackerel .....	24,325,000	826,951	1,478,170
Swordfish .....	2,717,100	1,030,248	1,277,311
Pollock .....	21,965,800	432,946	934,009
Scallops (gals.) .....	88,540	479,983	352,205
Hake .....	15,642,400	332,519	859,312
Halibut .....	1,175,600	196,143	268,465
Salmon .....	308,700	73,140	138,550
Smelts .....	679,900	76,155	86,018

*New Brunswick*

Total landings in New Brunswick for 1945, including those of inland waters, decreased by about twenty-eight and one-half million pounds when compared with 1944. The total landed value remained at the same level as last year and the value of the catch marketed increased by over \$1,000,000. A large decrease occurred in the sardine fishery and smaller decreases occurred in all the other important varieties with the exception of lobsters, where the catch increased by about 300,000 pounds.

The following table shows the total provincial catch, landed value and marketed value of all fish caught, as well as similar information concerning the principal varieties:

1945			
Total quantity of all fish landed .....		147,623,100	pounds
Total landed value .....		\$ 5,535,542	
Total marketed value .....		\$ 14,299,508	
	Pound	Landed Value \$	Marketed Value \$
Lobsters .....	7,579,500	1,938,158	5,481,701
Sardines .....	46,130,000	761,144	2,909,799
Cod .....	14,794,500	521,479	1,008,028
Herring .....	32,093,300	398,130	1,715,593
Smelts .....	3,917,800	424,415	656,482
Salmon .....	729,200	176,168	361,232
Clams .....	4,715,900	102,343	219,888
Oysters .....	4,588,200	161,184	269,035
Hake .....	2,628,000	72,872	165,222

### Prince Edward Island

Total landings in Prince Edward Island increased by approximately six and one-half million pounds when compared with 1944, with corresponding increases in landed and marketed values. Increased catches occurred in the lobster, cod, hake, mackerel and smelt fisheries. Slight decreases occurred in landings of herring and oysters.

The table below gives the total catch, landed and marketed values for all fish taken during the year as well as similar information concerning the principal varieties:

1945			
Total quantity of all fish landed .....		33,804,900	pounds
Total landed value .....		\$ 2,309,156	
Total marketed value .....		\$ 3,081,424	
	Pounds	Landed Value \$	Marketed Value \$
Lobsters .....	8,115,800	1,503,647	1,532,799
Cod .....	5,617,200	208,421	391,964
Hake .....	4,697,800	175,776	359,538
Mackerel .....	2,939,100	140,050	279,255
Smelts .....	1,177,900	95,534	155,615
Herring .....	5,049,200	51,954	157,245
Oysters .....	1,444,200	68,480	84,920

### SPORT FISHING

#### Nova Scotia

Salmon angling in Cape Breton Island improved over the previous year. During the last of June and early July salmon angling conditions were very good. Poor water conditions prevailed during August but improved greatly during the month of September. The catch of trout decreased, due to unfavourable water conditions and unseasonable weather during the early part of the season. Late in the season prolonged dry weather tended to discourage angling. In the eastern mainland angling was fairly good until the end of June. After that the weather was hot and dry with little rainfall and catches, although greater than last year, were less than would have been realized had better water conditions prevailed. In the western mainland, the catch of salmon increased considerably over 1944. Heavy rainfall with subsequent high water conditions during the spring attracted salmon from the sea and allowed them to ascend well up into the rivers during May, June and July when anglers are more active.

#### New Brunswick

In New Brunswick dry weather and low water conditions prevailed during a greater part of the angling season and for a part of the time the woodlands were closed to travel. The catches taken under these conditions were considered satisfactory.

*Prince Edward Island*

Angling in Prince Edward Island was fairly good throughout the season with some very good catches taken in the rivers and millponds during the early part of the season. Heavy rains during May and June kept the water levels high for the greater part of the summer.

*Deep Sea Angling*

A renewed interest was shown in deep sea angling and a general revival of this sport may be looked forward to during the coming years. Swordfish angling was carried on off the Cape Breton coast but, although a large number of these fish were reported, only one strike was made. A number of tuna were landed by rod off Glace Bay, these fish ranging from 15 to 165 pounds. Tuna were plentiful in the vicinity of Wedgeport and there was more angling for these fish than for several years past. In the Bay of Fundy section of New Brunswick, angling for pollock was carried on. Angling for mackerel was undertaken enthusiastically in Prince Edward Island by tourists, with satisfactory results.

## STATEMENT OF LOBSTER PACK AND THE INSPECTION OF CANNERIES DURING 1945

During the year 1945 licences to can lobsters and tomalley were issued, covering 145 canneries. Of this number, 141 were actually operated, as compared with 137 in 1944, 128 in 1943 and 113 in 1942. Comparative figures by provinces show the following distribution:

	1945	1944	1943	1942
Nova Scotia .....	38	39	36	33
New Brunswick .....	51	49	44	37
Prince Edward Island .....	52	49	48	43
	141	137	128	113

*Lobster Pack*

During 1945 the unrevised figures show a total production of canned lobster within the division of 59,684 cases, as compared with 59,035½ cases in 1944, an increase of 648¾ cases. Comparing the 1945 production with previous years, the following results are noted:

Year	Pack. Cases	Inc. or Dec. Cases	Percentage Inc. or Dec.
1945 .....	59,684		
1944 .....	59,035½	+ 648¾	+1
1943 .....	56,858½	+2,825¾	+4.9
1942 .....	59,427½	+ 256¾	+ .4

Statistics of pack show the following production by provinces:

Province	1945	1944	Inc. or Dec. Cases
Nova Scotia .....	20,541	20,589¾	- 48¾
New Brunswick .....	16,139½	17,445½	-1,306
Prince Edward Island .....	23,003½	21,000	+2,003½
	59,684	59,035½	

The pack for Nova Scotia shows the following decreases when compared with previous years:

Year	Pack Cases	Inc. or Dec. Cases	Percentage Inc. or Dec.
1944 .....	20,589¾	- 48¾	- .23
1943 .....	20,837½	-296¾	-1.42
1942 .....	21,696	-155	- .70

The New Brunswick pack, when compared with previous years, shows the following decreases:

Year	Pack Cases	Inc. or Dec. Cases	Percentage Inc. or Dec.
1944 .....	17,445½	-1,306	-7.48
1943 .....	17,434½	-1,295	-7.42
1942 .....	17,436	-1,297	-7.43

The Prince Edward Island pack, when compared with previous years, shows the following increases:

Year	Pack Cases	Inc. or Dec. Cases	Percentage Inc. or Dec.
1944 .....	21,000	+2,003 $\frac{1}{2}$	+9.54
1943 .....	18,586	+4,417 $\frac{1}{2}$	+23.76
1942 .....	19,788	+3,215 $\frac{1}{2}$	+16.24

During the 1945 Spring season there were 51,021 cases canned, as compared with 46,259 $\frac{1}{4}$  cases in the Spring of 1944, an increase of 4,761 $\frac{3}{4}$  cases or 10.2 per cent. Provincial figures for the Spring pack show the following:

Province	Cases Packed 1945	Cases Packed 1944	Inc or Dec. Cases	Percentage Inc. or Dec.
Nova Scotia .....	20,541	20,587 $\frac{3}{4}$	-46 $\frac{3}{4}$	-.22
New Brunswick .....	10,262 $\frac{1}{2}$	8,401 $\frac{1}{2}$	+1,861	+22.15
Prince Edward Island ..	20,217 $\frac{1}{2}$	17,270	+2,947 $\frac{1}{2}$	+17.06

During the Fall season the pack totalled 8,663 cases as compared with 12,776 cases in 1944, a decrease of 4,113 cases or 32.19 per cent.

Provincial figures covering the Fall pack show the following:

Province	Cases Packed 1945	Cases Packed 1944	Inc or Dec. Cases	Percentage Inc. or Dec.
Nova Scotia .....	.....	2	-2	-100
New Brunswick .....	5,877	9,044	-3,167	-35.01
Prince Edward Island ...	2,786	3,730	-944	-25.30

#### CANNERY INSPECTION

During 1945 careful attention was given to the inspection of canneries and 647 inspections were conducted by 27 inspecting officers, the average number of inspections being 4.5 per cannery.

#### FISHERIES PATROL SERVICE

##### *Nova Scotia*

In the Cape Breton Island section the usual patrol was carried out in lobster fishing district 6A with satisfactory results. Along the eastern mainland patrol was carried out by the department-owned boat *A. Halkett*, assisted by the patrol boat *No. 666*.

In the western section patrol was carried out by the department-owned boats *Capelin* and *Gilbert*, assisted by a chartered boat in the Yarmouth area.

##### *New Brunswick*

In the Bay of Fundy section the department's boats *Thresher* and *Gannet Rock* were again employed in patrol work. A new boat to replace the *Thresher* was taken over from the builders late in the year and is expected to be in operation early in the new year. In the Northumberland Strait section a fleet of four chartered boats was engaged. These were on duty from the last of April until late in November.

##### *Prince Edward Island*

In Prince Edward Island six boats were engaged. One of these was the department-owned *Capitol* and the others were chartered for service in the several sections of the island.

Generally speaking, the patrol services gave effective protection to the fisheries. The boats were primarily engaged in the protection of the lobster fishery, with attention also being given to the salmon, oyster, smelt and other fisheries as required.

#### FISH INSPECTION

The inspection staff, especially those employed in the large producing areas, have had an exceptionally busy season and have carried out the inspection work quite satisfactorily. Some trouble was experienced during the year in the inspection of dried fish for export, as with the additional duties required of the officers they could not devote their full time to supervising the culling and



packing of this fish. This has been taken care of by bringing in officers from less busy districts who have had experience in culling and grading and almost 100 per cent inspection is now provided for those firms packing dried fish for export.

Improvement in the packing and grading of oysters seems to be coming along slowly. This phase of the work requires an especially trained officer to instruct further both packers and inspecting officers so that there may be a uniform grading in all producing areas.

#### EDUCATION

During the year very little instruction in fish curing was afforded fishermen, fishing groups or firms and, in fact, very few requests were made for such instructions. The instructors were required throughout the year to carry on inspection of boneless fish products and to assist our regular inspectors in the inspection of salt fish for export.

The usual adult education work among fishermen was carried out by St. Francis Xavier University, under the arrangement made with the university by the department, and at departmental expense. The program now generally takes the form of instruction in business management, the introduction among all groups of a standard accounting system, and so on. Short courses were given for leaders and bookkeepers with satisfactory results.

#### CONCLUSION

The heavy volume of inspection for export sales and for those kinds of cured fish under compulsory inspection for domestic consumption has taxed the staff of the division to capacity since there has been no increase in the inspectional staff. However, there has been little cause for complaint. The new instructors taken on for inspection of frozen fish products turned out a good job and relieved the regular Inspectors Grade II of the work in this regard. The Chief Supervisor can only speak in the highest terms of the loyal support he has received from all men in the field, most of whom, during the war years, have worked straight through without leave, or with very little leave, in order that the work might be carried on.

The support of headquarters, Ottawa, in all matters submitted for decision or action is appreciated.

### APPENDIX NO. 3

#### ANNUAL REPORT ON FISH CULTURE

*By J. A. RODD, Director of Fish Culture*

Fish cultural operations in 1945 were carried on by the Department of Fisheries in Nova Scotia, New Brunswick and Prince Edward Island where the fisheries are entirely, or to a large extent, under federal administration. Thirteen main hatcheries, six rearing stations, six salmon retaining ponds and several egg collecting camps were operated with a total output from these establishments of 30,191,910, over 78 per cent of which were distributed in the fingerling and older stages. The output by species, hatcheries and provinces was:—

STATEMENT BY SPECIES OF THE FISH DISTRIBUTED DURING THE YEAR ENDED  
DECEMBER 31, 1945

Species	Fry	Advanced fry	Fingerlings	Yearlings and older	Total distribution
<i>Salmo salar</i> —Atlantic salmon .....	165,000	4,134,800	11,490,534	101,490	15,891,824
<i>Salmo irideus</i> —rainbow trout .....			12,984	12	12,996
<i>Cristivomer namaycush</i> —salmon trout .....			69,000		69,000
<i>Salmo salar sebago</i> —sebago salmon .....			28,000	38,238	66,238
<i>Salvelinus fontinalis</i> —speckled trout .....	154,700	2,011,480	11,870,406	115,266	14,151,852
	319,700	6,146,280	23,470,924	255,006	30,191,910

HATCHERIES AND REARING STATIONS OPERATED, THEIR LOCATION, DATE ESTABLISHED, THE SPECIES AND THE NUMBER OF EACH SPECIES DISTRIBUTED FROM EACH ESTABLISHMENT DURING 1945

Estab- lished	Hatchery	Location	Species	Fry	Advanced fry	Fingerlings					Year- lings and older	Total distrib- ution by species	Total distrib- ution by hatcheries
						No. 1	No. 2	No. 3	No. 4	No. 5			
1929	Antigonish.....	St. Andrews, N.S.	Atlantic salmon.....		100,000	885,000	370,000				7,206	985,000	
1876	Bedford.....	Bedford, N.S.	Speckled trout.....		100,000	2,500,500		19,000	12,870			3,069,576	4,054,576
1937	Cobequid.....	Jackson, N.S.	Atlantic salmon.....		50,000	421,700	4,920	14,570				14,570	
1938	Coldbrook (I).....	Coldbrook, N.S.	Speckled trout.....		235,000	136,000	124,400					476,020	491,100
1936	Grand Lake (I).....	Wellington Station, N.S.	Speckled trout.....			454,400	222,000					545,400	
			Atlantic salmon.....			2,000	154,300	107,000				676,400	2,231,800
			Sebago salmon.....			110,000	185,000					263,300	263,300
1937	Kejimikujik (I).....	New Grafton, N.S.	Speckled trout.....						7,000			355,990	
			Atlantic salmon.....									31,615	38,615
1912	Lindlof.....	St. Peters, N.S.	Atlantic salmon.....				25,530	46,720	308,250	13,730		34,799	420,404
1902	Margaree.....	N. E. Margaree, N.S.	Speckled trout.....			420,000	135,000					368,250	368,250
1935	Mersey River (I).....	Liverpool, N.S.	Atlantic salmon.....		480,000	1,286,000	70,220				14,860	555,000	454,230
1913	Middleton.....	Middleton, Annapolis County, N.S.	Speckled trout.....			1,210,000	270,000					1,371,080	1,926,080
			Atlantic salmon.....			700,000		107,530		44,400	7,729	1,960,000	2,667,729
			Speckled trout.....									107,530	107,530
			Atlantic salmon.....			340,000	275,000	155,000				44,400	151,930
			Salmon trout.....					69,000				770,000	770,000
			Rainbow trout.....					31,320				69,000	69,000
1933	Nictaux Falls (I).....	Nictaux Falls, N.S.	Speckled trout.....			50,000	284,000	320,250	46,200			5,320	
1929	Yarmouth.....	South Ohio, N.S.	Atlantic salmon.....	25,000								700,450	1,544,770
1939	Charlo.....	River Charlo, N.B.	Speckled trout.....		55,000	474,000	70,000		125,000		1,253	180,000	
			Atlantic salmon.....		477,480	1,357,500	386,240	134,000				1,022,733	1,022,733
1928	Florenceville.....	Florenceville, N.B.	Speckled trout.....	10,000				1,600			2,565	1,877,740	1,202,733
			Atlantic salmon.....		450,000	770,000	365,000				40,500	1,625,300	1,891,905
			Sebago salmon.....									48	
			Speckled trout.....		610,000	805,000	13,970	4,500	7,500	1,000	30,365	1,529,335	3,157,883
1880	Grand Falls.....	Grand Falls, N.B.	Atlantic salmon.....			1,305,000	180,000	314,600				1,793,000	1,793,000
1874	Miramichi.....	South Esk, N.B.	Speckled trout.....	15,000		339,480	40,000	866,890	11,330			1,279,700	3,072,300
			Atlantic salmon.....		2,559,800	591,200	184,250					3,305,250	
1914	Saint John.....	Saint John, N.B.	Speckled trout.....		95,000	95,000	32,000	10,250				137,550	
			Atlantic salmon.....		205,000	253,000	384,434	1,000				843,434	3,473,100
			Rainbow trout.....							823	12	7,676	
			Sebago salmon.....				6,841						
1938	Cardigan (I).....	Cardigan, P.E.I.	Speckled trout.....	129,700	619,000	514,500	21,000	150,700	83,248	22,930	6,575	2,150,182	3,038,870
1906	Kelly's Pond.....	Southport, P.E.I.	Atlantic salmon.....			4,000	45,000	93,600				138,660	
			Speckled trout.....	140,000		214,000	147,500	100,970				282,470	391,130
			Atlantic salmon.....		50,000							404,900	
			Speckled trout.....		95,000	244,030						339,080	743,950
				319,700	6,146,280	15,593,850	4,610,223	2,522,560	661,398	82,883	255,006	30,191,910	30,191,910

(I) Rearing station.

The fry and fingerlings included in this distribution were from collections in the autumn of 1944 and the spring of 1945.

## HATCHERY OUTPUT, BY PROVINCES, OF FRY, FINGERLINGS, YEARLINGS AND OLDER FISH DURING 1945

—	Fry	Advanced fry	Fingerlings					Yearlings and older	Total distribution by species	Total distribution by province
			No. 1	No. 2	No. 3	No. 4	No. 5			
<i>Nova Scotia—</i> Atlantic salmon..... Rainbow trout..... Salmon trout..... Sebago salmon..... Speckled trout.....	25,000	870,000	3,151,000	989,400	277,100 5,320 69,000	493,250		60,990	5,866,740 5,320 69,000 38,615 8,453,067	
		687,480	5,888,600	1,200,970	492,970	7,000 59,070		31,615 65,847		
	25,000	1,557,480	9,039,600	2,190,380	844,390	559,320	58,130	158,452	14,432,742	14,432,742
<i>New Brunswick—</i> Atlantic salmon..... Rainbow trout..... Sebago salmon..... Speckled trout.....		3,214,800	4,276,700	1,499,924 6,841 21,000 699,588	449,000			40,500 12 6,623 49,419	9,481,524 7,676 27,623 5,107,235	
	154,700	1,229,000	1,814,580		1,033,940	102,078	23,930			
				2,227,353	1,483,540	102,078	24,753	96,554	14,624,058	14,624,058
	154,700	4,443,800	6,091,280							
<i>Prince Edward Island—</i> Atlantic salmon..... Speckled trout.....	140,000	50,000 95,000	214,900 248,080	45,000 147,500	93,660 100,970				543,560 591,550	
	140,000	145,000	462,980	192,500	194,630				1,135,110	30,191,910

## NUTRITIONAL EXPERIMENTS

Nutritional experiments were continued as usual with fingerlings and parent stock, principally speckled trout. Rations that proved least efficient last year were discarded and several new ones tried. In the experiments with fingerlings 50 tests were made and 27 diets used, made up of 18 ingredients. With parent stock hatchability tests were not as extensive as the previous year as four of the hatcheries were unable to secure a continuity of supply of the necessary ingredients. However, 9 tests were made and 8 diets used, made up of 12 ingredients. Some of the rations gave promising results at some hatcheries from the standpoint of survival, growth, and cost of food to produce a pound of fish.

## CHARLOTTE COUNTY LAKES EXPERIMENT

In continuation of the Charlotte County Lakes experiment, a co-operative effort between the Fish Cultural Branch and the Atlantic Biological Station of the Fisheries Research Board, creel censuses were taken in Kerr and Welch Lakes and the following lakes were stocked with speckled trout: Crecy 812 yearlings, Welch 1,200 No. 5 fingerlings, and Gibson 7,718 No. 2 fingerlings. The yearlings and 2,718 of the fingerlings were marked before being distributed from the Saint John hatchery. Crecy and St. Patrick Lakes were closed to all fishing until the opening of the trout fishing season for New Brunswick in 1946. The creel census returns of 1945 again indicated poor productivity with yields per acre of .17 pounds in Kerr and .07 pounds in Welch Lakes. The extremely low production per acre in all 8 lakes as shown by the following summary confirms the need of determining means of improving the fertility or productive capacity for trout in these and other lakes of similar type in the Maritime Provinces.

Lakes	Census Year	Yield per acre (pounds)
Limeburner .....	1942	0.4
	1943	0.1 (approximate)
Bonaparte .....	1942	1.1
	1941	0.9
Johnson .....	1942	0.1 (approximate)
	1941	0.4
	1942	0.2
St. Patrick .....	1945	0.17
	1943	0.7 (approximate)
	1944	0.98 (approximate)
Crecy .....	1943	2.0
Crecy and outlet pond.....	1944	1.93 (approximate)
Welch .....	1944	0.58
	1945	0.07
Gibson .....	1944	0.76 (approximate)

The work on the Charlotte County Lakes was extended co-operatively to other waters in Nova Scotia and New Brunswick. The creel census indicates that some of these lakes are more productive and the addition of hatchery stock gave better returns than in the first mentioned lakes. Some assistance was given the Fisheries Research Board in their study of trout production in Prince Edward Island and Atlantic salmon in the Petitcodiac area, New Brunswick.

## SELECTIVE BREEDING

Selective breeding of speckled trout was continued to develop such characteristics as increased vitality, high yield, rapid growth, early spawning, colouration and general appearance. Outstanding pairs at the different hatcheries are mated and their progeny segregated. The progeny of the pairs in which survival is highest is retained for brood stock and periodically selected so long as they are profitable egg producers. The average yield of the selected pairs and of the general groups are indicated in the reports of the respective hatcheries. The range of small mouthed black bass in the Maritime Provinces was further extended by the transfer of 53 adults from Lake Utopia, Charlotte County, N.B.,



to Layton Lake, near Amherst, N.S. Smelt eggs collected in Lake Utopia, N.B., were supplied for distribution into Manito Lake, Saskatchewan. During the year 4,034 parent Atlantic salmon were impounded. The average yield of eggs per female was 8,089 and for the individual ponds were: Morell 7,529, New Mills 7,171, Miramichi 7,625, River Philip 10,155, Sackville 4,565, and Margaree 10,508.

Superintendent J. P. Chiasson of the Margaree salmon pond was assigned to observe the ascent of salmon at the Tusket River Power Development from May 15 to August 28. Salmon have two means open to them for going up this river, either through the fishway in the diversion dam, or through the fishway at the generating plant. It was claimed that a large portion of the salmon are held up near tide water and later congregate below the generating station, refusing to enter the fishway there. Traps were installed in both fishways the latter part of May and took 316 salmon, 116 of which were of the late run September 1 to October 31. Unusually high water conditions this year allowed the fish to use the fishway at the diversion dam and none was taken in the power plant fishway nor did they congregate in the tailrace of the plant as they were said to have done in 1944. Two hundred and eighty were also caught by anglers from week ended April 21 to July 28, 5 of which were taken above the diversion dam. A number of scales were removed from 25 salmon which were liberated above the dam. Five of these fish were marked with tags K. 3637—K. 3641.

#### FIN REGENERATION

Forty-eight landlocked salmon were marked when 2 years old at Florenceville hatchery by removal of the adipose and left pectoral fins. These fish now five years old showed no regrowth of the adipose fin but some regeneration of the pectoral was evident. Of the 48, twenty-two showed no regrowth of this fin, 14 showed one-third regrowth and 12 two-thirds regrowth. At Saint John hatchery in 1943 three groups of speckled trout fingerlings, 100 in each group, were marked by Supervisor Tingley by clipping the adipose and one side fin. These were examined in May 1944 and April this year when the fish were one and two years old, respectively. The adipose fin had not regenerated in any of the specimens but some regrowth was seen in the paired fins.

Estimated percentage regeneration (paired fins only)	GROUP 1		GROUP 2		GROUP 3	
	Adipose and left ventral fins No. specimens		Adipose and right ventral fins. No. specimens		Adipose and left pectoral fins. No. specimens	
	May 1944	April 1945	May 1944	April 1945	May 1944	April 1945
0 .....	29	40	64	75	80	82
10 .....	8	8	16	7	5	4
20 .....	6	7	8	1	4	4
30 .....	10	0	4	3	4	0
40 .....	13	6				
50 .....	0	0			0	1
60 .....	2	4				
70 .....	4	0				
80 .....	3	3	0	1		
90 .....	2	0				
95 .....	2	2				
100 .....	0	2				
	79	72	92	87	93	91

Group 1 was marked August 13, 1943 when fingerlings were 2 to 2½ inches long, Group 2 September 8 that year when fingerlings were 3 to 3½ inches and Group 3 same date, fingerlings 4 to 4¾ inches. The second estimate was made without reference to the first and suggests absorption had occurred in some of

the fins that had shown a low percentage of regeneration at the time of the first examination or that fin stubs which were thought to show a small percentage of regeneration on first examination may have been passed as showing no regeneration in the 1945 examination.

The Canadian National Railways, the Canadian Pacific Railway and the Dominion Atlantic Railway companies continued their generous assistance and co-operation by furnishing free transportation for shipments of game fish and game fish eggs with their attendants. The extent of this co-operation is indicated in the following summary:

Railway	Total mileage on trip passes	Number of passages	Mileage on baggage car permits			Number of cases or cans			Number of permits
			Full	Empty	Total	Full	Empty	Total	
C.N.R.....	3,443	30	2,561	1,725	4,286	169	161	330	35
C.P.R.....	2,391	24	1,309	1,518	2,827	186	195	381	29
D.A.R.....	664	4	332	446	778	7	12	19	5
	6,498	58	4,202	3,689	7,891	362	368	730	69

NOTE.—Number of passages refers to transportation one way—a return trip counting as two passages. Number of permits refers to one way passages for cases or cans.

Operations generally at each establishment are referred to in the accompanying reports of supervisors and superintendents. Owing to conditions brought about by and following the war and a limited appropriation, no major new construction was undertaken, and repairs and replacements were confined to essentials. Collections, transfers and distributions are given to the nearest hundred in the summaries of operations at the respective establishments.

## MARITIME PROVINCES

### *Senior District Supervisor of Fish Culture, James Catt*

Taking into consideration the limited funds available for Fish Culture this year, operations in the Eastern Division were generally satisfactory. Plant operations did not include the construction of any new establishment but were confined to improvement of the existing hatcheries and rearing ponds.

Following the spring thaw heavy and continued precipitation resulted in unusually high water until well into the summer, but in late summer and early fall drought conditions verging on the extreme obtained in most Maritime areas.

Staff operations included hatchery inspections, collection of landlocked salmon and smelt eggs, collection and distribution of small mouthed black bass, examination of lakes and streams, preliminary surveys of possible hatchery and rearing pond sites, interim investigations of fertilized waters, distribution of Atlantic salmon fingerlings into the Middle Pollett River with check on results obtained, determinations as to the results of stocking, etc.

Successive freshets from late April until the end of May interfered with the efficient operation of the bass trap at Lake Utopia. The water rose to a maximum of 14 feet above the low winter level. This not only covered and flooded out the trap, but backing up on the Trout brook affluent, covered certain barrier beaver dams and permitted the bass to reach Trout Lake where they were observed in numbers in early June.

Notwithstanding this, 33 mature small mouthed bass were captured, transferred and liberated in Layton Lake, Cumberland County, N.S., in good condition June 6.

In order to make a collection of smelt eggs to stock Manito Lake, Saskatchewan, the spawning grounds for varieties "A," "B" and "C," Lake Utopia were held under observation from April 13 to June. As in the case of the black bass, freshets and high water materially interfered with the collection. Variety "A" smelts spawned in good numbers, Variety "B" in very great numbers, but Variety "C" run was so small as to give cause for doubt as to its future survival. The shipment was finally made up of about 500,000 ova Variety "B" and reached its destination in good condition.

Limited investigations as to the results of stocking disclosed some interesting results. For years many miles of Little Salmon River, Saint John County, N.B., above the barrier falls were devoid of trout. In 1941 two thousand speckled trout fingerlings were liberated in a small pond at the extreme headwaters of the river. On July 1, 1945 an examination of a short stretch of the stream immediately above the falls resulted in the capture of 20 trout from 4 to 8 inches in length.

On July 2 many rainbow trout were observed in the Falls, Crow, and main headwater branches of the Big Salmon River. These were the result of plantings, consisting of fingerlings of three strains of the species, made in the fall of 1944. By July, 1945 they had spread some miles both up and down stream from the points of liberation, and already had achieved a greater average size than the stunted strain of speckled trout native to the waters.

Little River, Saint John, again yielded excellent returns, more than half a ton of brown, rainbow and speckled trout being taken in a few hundred yards of water immediately below the hatchery grounds. This stream is well and constantly fertilized by waste products from the rearing pond drains. Many of the fish taken exceeded one pound in weight and a small number exceeded two pounds.

Mr. F. E. Justason, Supervisor of Fisheries, Black's Harbour, N.B., reported excellent returns from the stocking of Clear Lake, Charlotte County with Atlantic salmon. A large number of fish, each several pounds in weight, were taken or seen during the open season.

The number of landlocked salmon taken by anglers in Chamcook continues to exceed greatly the number captured before the restocking programme for that water was inaugurated. The system there employed embraces the distribution of fingerlings, yearlings and two year old marked fish. Of the parent fish captured on the spawning grounds in the fall, 81.7 per cent (marked) were definitely resultant from hatchery stocking.

Waters mentioned in the foregoing are all in the Saint John distribution area. Reports from most other districts in the Maritimes are generally encouraging.

Subsequent to the careful stocking of Little Magaguadavic Lake with yearling and older sebago salmon a definite increase in the spawning run in Clinch's brook was established. This brook is the main feeder to the Lake and it is from it the first local sebago salmon egg collections in that area were made. These from 1939 to 1941 averaged about 32,000. During the present year 132,800 good ova were obtained.

Distributions of one and two year old sebago stock in Skiff Lake have been followed by excellent reports as to an improved fishery. This stock was resultant from the ova obtained at Clinch brook 1939-1941 inclusive.

Fish Cultural procedure in the re-establishment of the speckled trout fishery has produced excellent results at McFadden Lake, Albert County. Procedure involved the poisoning of the total fish population, largely yellow perch and cyprinids, and the restocking of the water with small speckled trout fingerlings. Insufficient "cropping" of the planted fish and those resultant from natural



spawning has produced an abundance of trout of relatively small size. A programme calling for a larger annual total catch should improve the average size of the fish. This perhaps may be accelerated by fertilization of the water, already partially effected on the advice of Doctor A. W. H. Needler of the Atlantic Biological Station.

Reports from creel census takers on the results of stocking six lakes of varied character and wide dispersal in New Brunswick and Nova Scotia contain some interesting information. The stocking carried out in co-operation with the Fisheries Research Board constituted a test to determine the relative value of planting speckled trout of different sizes in a variety of lakes.

The following table indicates the percentage of marked fish out of the total captured at each lake. Owing to the small number taken from Black Lake, N.B. and Grant Lake, N.S., the percentages of 100 and 0 are not significant.

	Loch Lomond N.B.	Black Lake N.B.	Sutherland Lake N.S.	Grant Lake N.S.
Number trout caught.....	182	4	2,913	4
Number planted summer, 2½"-3".....	2,600	2,600	13,000	5,200
Fall, 4½"-5".....	520	520	2,500	1,040
Number marked trout caught from summer planting.....	20	4	88	0
Fall planting.....	5	0	227	0
Percentage marked trout in total catch.....	13.7	100	10.8	0
	Copper Lake N.S.	Lakes O'Law, N.S.		Upper Lake
		Lower Lake	Connect. Stream	
Number trout caught.....	326	162	72	20
Number planted.....		Sept. 10,000		
Summer 2½"-3".....	2,600	Dec. 2,000	3,000	0
Fall, 4½"-5".....	520	(a) 1	(b) 1	(c) 1
Number marked trout caught from summer planting.....	34	3	1	
Fall planting.....	38	2.5	2.8	
Percentage marked trout in total catch.....	22.1			5.0

(a) caught in lower lake, planted in stream.

(b) caught in stream, planted in lower lake.

(c) caught in upper lake, planted in lower lake.

The above indicates that both in regard to percentages and totals the number of fall planted fish 4½"-5" exceeded those 2½"-3" planted in the summer. During the late summer and fall additional plantings of trout 6 inches or more in length were made in Loch Lomond, Black, Sutherland, Copper, and O'Law Lakes. Reports on recaptures of these are not expected until 1946. Owing to the creel census taker obtaining other employment Grant Lake was dropped from the experiment.

Following a preliminary examination of Ball's Lake, N.B. by Doctor M. W. Smith and Supervisor F. A. Tingley it was included in the foregoing test and stocked in September with 3,808 speckled trout fingerlings 4½"-5" in length.

The test stocking of the Middle Pollett River with 249,700 Atlantic salmon fingerlings August 17-23 inclusive provided some interesting data. In all, six plantings were made; these covered about 10 miles of the stream. Within 24 hours of the first planting positive determination of dispersal over approximately a quarter of a mile of river was ascertained. By September 23 positive fusion of all plantings had taken place; fingerlings were found over the entire 10 miles of the river in which the six distributions had been made.



The assistance of Doctor Paul Elson in planting the fish and the co-operation of Doctor A. G. Huntsman, Doctor P. Elson and Mr. H. White in determining their dispersal is much appreciated.

The plan of transferring small mature fish from overstocked waters to an improved environment, successfully tested by the Department a few years ago was put into effect during the fall run of trout from Byers Lake—a small lake with very, or perhaps, too efficient spawning grounds in the Cobequid Mountains, N.S. The trout taken there were distributed in other small adjacent lakes formerly carrying fish of good size but in recent years depleted through angling.

Following a brief inspection of the Nictaux and Bathurst Lakes and of the Little Tobique River by Doctor A. W. H. Needler and the writer it was considered unnecessary to stock the lakes with speckled trout at present but in order to perhaps make better use of the Tobique River salmon fishery the department approved of the distribution of fingerlings in this river.

Meetings of the parent body and branches of the New Brunswick Fish and Game Protective Association were attended at St. Stephen, Saint John, Fredericton, Edmundston, and Moncton. The Fish Cultural Branch of the Department was also represented by invitation at conferences of the Saint John River Fishery Advisory Council, the Miramichi Salmon Fishery Advisory Council, the Nipisiguit River Fishery Conference, and the meetings of the Atlantic River Management Committee of the Fisheries Research Board.

The second annual conference of fish cultural officers held at Saint John December 18-21, is considered of great importance as a progressive step leading to increased efficiency. The meeting was attended not only by the department's officers of both branches, but by representatives of the fisheries research board and by provincial authorities.

#### *District Supervisor of Fish Culture, F. A. Tingley*

Early in the year biological material collected from waters the previous summer was examined and studied and some local field work done. Assistance was given in the collection of smelt eggs in the Lake Utopia area. High water made this collection difficult but a quantity was obtained for further stocking of Manito Lake, Saskatchewan. Assistance was also given in the examination of that section of the Pollett River in which salmon stocking tests are being conducted. After distribution of the salmon fingerlings periodic tests were made to determine the degree of dispersal. Time was also devoted periodically to assist the Saint John Fish and Game Protective Association in making a test of retention of trout fingerlings in crates in natural waters. The water chosen was Back Dam Lake or pond near South Bay in Saint John County. The test was undertaken on the theory that trout fingerlings might be reared as economically or more so under such conditions than in rearing ponds. It was successful only in refuting this theory—the fingerlings succumbing quickly to high water temperatures. Doctor M. W. Smith of the St. Andrews Biological Station was assisted in an examination of Balls Lake, Saint John County, prior to stocking this water with marked speckled trout fingerlings. The stocking of this lake is supplementary to the test stocking of six lakes in New Brunswick and Nova Scotia in 1944 in which determination of results is to be obtained by creel census takers. On September 27, three thousand eight hundred and eight fingerlings  $4\frac{1}{2}$  to 5 inches in length were planted. The records for this lake which is controlled by a Fishing Club will be obtained from the Club members. Thirty-three small mouthed black bass were taken in a fyke net set in Trout brook and on June 6 were transferred for stocking Layton Lake near Amherst, N.S. This lake formerly was affected by maximum spring tides but the Amherst Fish and Game Protective Association have now installed, at considerable expense, a substantial dam and tide gate. A further attempt was made to

secure early spawning speckled trout at Trout brook, Lake Utopia, with a view to developing an earlier spawning strain for hatchery brood stock. Unfavourable weather conditions, however, were encountered again early in the season. The net was in poor condition and failed to withstand the freshet in which the early spawners ascend. It was repaired and reset repeatedly but at the end of the season had captured only 28 females and no male fish. A twine trap was constructed and set in the affluent stream of Mill Lake in Lake Utopia area on September 18 with a view to capturing parent speckled trout. Provision was made for the escape of muskrats, but despite this precaution the trap was found cut by some aquatic mammal on October 12. Any fish that may have been trapped would have escaped. The trap was recovered with wire netting on October 15, but although kept in operation up to December 4, no trout were taken. At Chamcook Lakes the traps were installed on October 19. Up to November 23 when they were removed and the fish released, a total of 131 sebago salmon comprising 46 males and 85 females was captured. The yield of eggs was 68,000 as compared with 26,100 for this camp the previous year. One hundred and seven of the 131 fish, or 81.7 per cent, had been marked by clipping of adipose and left ventral fins. At Gibson Lake the traps were installed in the same locations as in 1944. At the lower trap where the greatest number was taken that year none was captured or observed. The catch at the upper trap totalled 20 with 16 of them males. Four thousand eggs of poor quality were taken from 3 of the females and the fourth was spent on capture. Five, or 25 per cent of the 20 salmon impounded had been marked by removal of the adipose and left ventral fins. Moose creek, Saint John County, was examined and the following conferences attended during the year: annual meeting of the New Brunswick Fish and Game Protective Association at Fredericton, September 11; Nipisiguit River Fishery meeting, Bathurst, September 28; Saint John River Fishery Advisory Council, Fredericton, October 4; Miramichi Salmon Fishery Advisory Council, Boisetown, October 5, and conference of Fish Cultural Officers, Saint John, December 18 to 21.

In September and later the fish cultural establishments at the following places were inspected: Florenceville, Grand Falls, Yarmouth, Middleton, Bedford, Cobequid and Grand Lake.

*District Supervisor of Fish Culture, A. P. Hills*

In the early months of the year, material collected the previous season was examined and identified, and some local field work done. During the latter part of April and early May, Doctor M. W. Smith of the Fisheries Research Board, St. Andrews, N.B., was accompanied to various points in the Maritimes where census takers were appointed for lakes that had been previously selected for trout stocking tests. These appointments covered Sutherland, Grant, Copper and O'Law Lakes in Nova Scotia and Loch Lomond and Black Lakes in New Brunswick. The Yarmouth area was visited during the latter part of May when examinations of proposed distribution areas for advanced fry and small fingerlings were carried out. These streams were again inspected in early September. While in this area, plankton tows were made and one of the concrete ponds at Yarmouth hatchery stocked as an experiment in rearing plankton. The annual meeting of the New Brunswick Guides Association at Fredericton was attended on May 31 and several meetings with executives of various Fish and Game Protective Associations were held, including those at Moncton, Charlottetown, Saint John, Campbellton, etc. The Fish Cultural Officers' conference at Saint John in December was also attended. Waters examined and reported on during the year included Cornwallis River, Simpson's Lake, Hollahan Lake, Salmon River (Truro), Parrsboro Aboiteau, and Black Lake in Nova Scotia, and Big or Back and Eastern Lakes in New Brunswick. Byers Lake in Cumberland County,

Nova Scotia, was visited in connection with the proposed transfer of undersized fish to other waters. Seining and plankton tows were made at Bulmer's pond, Sackville, N.B., and netting operations were carried out in Howe and Dark Lakes at Saint John. Some ponds in the vicinity of Moncton were examined in connection with proposed fertilization by the Moncton Branch of the Fish and Game Protective Association. Assistance was given with the distribution of salmon fingerlings in the Pollet River and later with assessing their dispersal. Inspections were carried out during the year at the following establishments, ten of them being visited twice: Yarmouth, Kejimikujik, Mersey, Middleton, Coldbrook, Bedford, Grand Lake, Antigonish, Lindloff, Margaree, Margaree salmon pond, Cobequid, Kelly's, Cardigan, Miramichi, New Mills, Charlo, Grand Falls and Florenceville.

#### ANTIGONISH HATCHERY

*W. D. Turnbull, Superintendent*

The hatchery ponds between October 31 and December 6 produced 11,868,600 speckled trout eggs which were laid down in Antigonish hatchery. This collection was supplemented by receipt on March 22 of 1,005,800 Atlantic salmon eggs from Cobequid hatchery. Speckled trout eyed eggs were transferred in February and March to the following hatcheries: Middleton 1,000,000; Yarmouth 1,000,000; Bedford 500,000; Lindloff 1,500,000; Florenceville 500,000; Cobequid 1,000,000; and Grand Falls 600,000. Forty thousand speckled trout fingerlings were sent to the Grand Lake rearing station September 24 and October 1. Distributions for the year were 985,000 Atlantic salmon and 3,069,600 speckled trout, of which 1,988 of the latter species were marked by fin clipping and distributed 260 in Copper Lake, Antigonish County, 1,250 in Sutherland Lake, Cumberland County, and 478 by Doctor Beatty in Round Lake in the Musquodoboit area. Fifty trout, 2 years of age, and thirty, 3 years, were placed at the disposal of Doctor Black, Dalhousie University, in connection with his research work on this species. In selective breeding 27 pairs of 2 year old trout averaged 2,791 eggs per female as against 1,371 in the general group of the same age; likewise 12 pairs of 3 year old trout averaged 2,803 per female as against 1,671 in the general group. The walls of eight long ponds were broken down and replaced by new concrete work. The hardwood floors of the living quarters and office in the old hatchery building were taken out and replaced by concrete. Two concrete walls, also in this building, each the length of the supply troughs and extending one foot above them, were built, replacing the decayed wainscoting and studding. Excellent fishing is reported from most of the waters stocked from this hatchery.

#### BEDFORD HATCHERY AND SACKVILLE RIVER SALMON-RETAINING POND

*George Heatley, Superintendent*

On November 5 twenty-one thousand seven hundred speckled trout eggs were taken from the fish being held at Bedford for research studies by Doctor Black of Dalhousie University, Halifax, and were laid down in the hatchery. This collection was supplemented by receipt of 1,004,500 speckled trout eggs from Cape Cod Trout Company via Rainbow Ranch, Spokane, Washington, in January, 500,000 same species from Antigonish hatchery in February and 845,300 Atlantic salmon eggs from Sackville pond in November. Thirty thousand of the last mentioned are to be used for continuation of research work at Dalhousie University. In May and June shipments of young fish to the rearing stations were made, 406,000 speckled trout to Coldbrook, 345,000 Atlantic salmon to Grand Lake, and 225,000 same species to Mersey. Distributions direct from Bedford for this year were 14,600 Atlantic salmon and 476,600 speckled trout.



Transfers of fish from Antigonish to Bedford, transfers and distributions to and from Grand Lake Rearing Station and distributions from Coldbrook were made by the Bedford hatchery staff and truck. Assistance in transfer of fish from Cobequid hatchery to the Petitecodiac water system was also given. A rough stone wall 18 inches wide was built along the south side of the concrete ponds and base of rock garden making a substantial retaining wall and walk. The hollow between this and the river wall was filled, graded and surfaced ready for seeding. The woodwork of the interior of the hatchery was painted and the grounds improved generally. A general improvement was noted in nearly all waters stocked, and the fullest co-operation was received from the fishery supervisors and game association.

At the Sackville River pond between October 8 and 26, three hundred and sixty-four Atlantic salmon, a large majority of which were grilse, averaging 5 pounds in weight, were taken, of which 175 females were stripped November 1 to 16 yielding 845,300 eggs. Among the fish captured at the pond was a salmon bearing tag K:3631. It weighed on October 24 this year 12 pounds and had a length of 35 inches. This male fish was originally tagged and liberated in the Sackville River November 6, 1943, at which time it weighed 6½ pounds and was 27½ inches long. Low water prevailed early in the season but a freshet November 5 and 6 flooded the entire area and permitted the bulk of the adult salmon to pass upstream over the dam and fence. A much larger number of salmon was in evidence at the mouth of the river this year than has been the case for a number of years. Fifty grilse and 20 salmon were retained in the canal and later in the rearing tanks for research work at Dalhousie University. A leak in the toe of the dam was repaired and a number of retaining crates constructed.

#### COBEQUID HATCHERY AND RIVER PHILIP SALMON-RETAINING POND

*P. B. Stratton, Superintendent*

From January 29 to March 22 speckled trout eggs were secured, 787,800 from Cape Cod Trout Company via Rainbow Ranch and 1,000,000 from Antigonish hatchery. In November 1,025,700 Atlantic salmon eggs were obtained from River Philip salmon retaining pond. From March 21 to April 3 outgoing shipments of Atlantic salmon eggs were 1,005,800 to Antigonish, 990,600 to Saint John and 602,000 to Nictaux Rearing Station. Distributions from Cobequid for the season were 676,400 speckled trout and 545,400 Atlantic salmon. Thirty-six new debris catch boxes with bottom of one-eighth inch mesh wire screening slotted into a four inch frame were made for the hatchery troughs and electric lighting was extended to the icehouse and to the outside rearing troughs. An attempt was made to transfer undersized trout from Byers Lake to several apparently less productive lakes in the adjacent locality. The results of trapping these fish, however, were not as successful as had been anticipated. Of 95 taken October 2 to November 1, eighty were transferred to Musquash Lake. Assistance was given the Fisheries Research Board in planting hatchery product in the Petitecodiac area. The fish and game association of the district, when assistance was requested, showed willingness to co-operate. Assistance was also rendered by the fishery inspectors when called upon. Fishing conditions generally were reported as being improved during the year.

At River Philip salmon-retaining pond a break occurred in the fence at the dam on October 25, caused no doubt, by logs being carried against it. It was the end of the month before repairs were completed. This, together with adverse water conditions in the early part of the season, militated against a satisfactory collection of salmon being made. However, 185 were taken, averaging 16 pounds, between October 15 and November 21. From 101 females stripped November fifteen to twenty 1,025,700 eggs were secured and laid down in Cobequid hatchery.



## COLDBROOK REARING PONDS

*E. Barrett, Superintendent*

After opening on May 1 the usual work of relining the ponds with gravel, disinfecting with HTH and connecting the water supply was carried on in preparation for receipt from Bedford, between May 21 and June 6, of 406,000 speckled trout advanced fry and fingerlings. With the assistance of the Bedford staff and truck, 263,300 speckled trout were distributed. Valuable assistance was also rendered by members of the Kings County Fish and Game Association and by Fishery Officers of the district. An experiment in fertilizing Simpson Lake was carried on under the supervision of the Superintendent of the Dominion Experimental Station at Kentville. Stock for introduction into the lake was supplied from Coldbrook. Repair work at the supply dam was started and 29 feet completed, but, owing to shortage of labour, full repairs were not effected. In addition, all joints and cracks in the planking of the gateways were caulked with oakum which stopped considerable water leakage. Favourable reports were received from waters stocked from this establishment.

## GRAND LAKE REARING PONDS

*W. H. Cameron, Superintendent*

Bedford hatchery in June supplied 345,000 Atlantic salmon and Antigonish in September and October 40,000 speckled trout fingerlings. Although the water level was low until well on in October, collecting operations at Rawdon River and Waverley Run resulted in a catch of 26 sebago salmon averaging 1½ pounds in weight, 12 of which were females yielding 14,200 eggs. Of the 26 caught in the traps 13 or 50 per cent bore the Grand Lake pond mark. In addition, anglers reported 169 marked seabagos during the year from Grand Lake, 66 from Lake William, 1 from Long Lake and 5 from Beaverbank Lake. At the hatchery ponds 380 sebago females in November yielded 171,700 eggs, almost double the number taken in 1944. Of these 78,300 were taken from 3 year old fish, the progeny of the first hatch obtained from pond stock in 1942. Distributions for the season were 34,800 speckled trout, 38,615 sebago salmon, which were marked by fin clipping, and 356,000 Atlantic salmon, of which 4,945 yearlings were marked. The marked seabagos were planted 33,670 in Grand Lake, 1,200 in Beaverbank Lake, 125 in Petitcodiac River and 3,620 in Rawdon River, the marked Atlantic salmon 1,200 in Beaverbank River, 3,620 in Rawdon River and 125 in Petitcodiac River. Four hundred and forty, one year old fish, were supplied the Fisheries Research Board as follows, 190 Atlantic salmon for the Fisheries Experimental Station, Halifax, 125 Atlantic salmon, and the same number of sebago salmon for planting in the Petitcodiac water system. A small percentage hatch was obtained again from eggs of sebago salmon pond stock, and as in the three previous years, the resultant fry were stronger and made better growth than the progeny of the wild fish. The supply pipe and the circular and long ponds were repaired. One long pond was widened and deepened to hold brood stock. The bridge across the lock was rebuilt and the road approaching the ponds repaired and gravelled. Forty-six lath covered shades for the long ponds were made. The walks between some of the ponds were gravelled and all the rooms in the upper story of the dwelling painted.

## KEJIMKUIK REARING PONDS

*T. K. Lydon, Superintendent*

In May and June 105,000 speckled trout fingerlings were received from Middleton and 500,000 Atlantic salmon from Yarmouth hatchery. From these 86,000 trout and 368,250 salmon were distributed. Improved salmon fishing was

reported in the Medway and Lahave Rivers. Assistance in locating suitable grounds and in making distributions was received from the North Queens Branch of the Fish and Game Association and from the Fishery Inspector for the district. Twenty-four new rearing troughs were built and set up and all wooden centres in the ponds renewed. The dwelling, garage and icehouse were painted and the grounds improved generally.

#### LINDLOFF HATCHERY

*W. T. Owens, Superintendent*

Speckled trout egg collections in October and November amounted to 1,513,200 from the hatchery ponds and 194,800 from McRae Lake. The collections were supplemented by receipt in November of 1,124,400 Atlantic salmon eggs from Margaree pond and in March by 1,500,000 speckled trout from Antigonish. Distributions for the season were 555,000 Atlantic salmon and 1,371,100 speckled trout, including 10,340 of the latter, one and two years old, marked by fin clipping and planted 2,340 in McIntyres Lake and 2,000 in each of the following—Blackett, Ferguson, Grand and McIsaac Lakes. One thousand, six hundred and forty-five speckled trout were transferred from McRae Lake to Lindloff Lake. This lake which was stocked with McRae Lake trout in 1944 furnished the best fishing of any lake in this area, with as many as forty anglers observed there in a single day. Four hundred and ten fish were reported caught bearing the hatchery mark. Angling in the various waters stocked in the district was reported reasonably good. Kytes Lake, Richmond County, offered its usual excellent run of early fish. In selective breeding 7 pairs of 2 year speckled trout, McRae Lake cross, yielded 1,205 eggs per female as against 711 per female in the general group, and 9 pairs, same age, Antigonish stock, yielded 2,261 eggs per female as against 1,198 per female in the general group. A new concrete bridge and spillway was constructed in the dam which was raised 2 feet, giving that amount of additional water storage in the lake that supplies water for the hatchery and ponds. A new building containing icehouse, garage, feed room and brine freezer was constructed and some varnishing and painting done in the dwelling.

#### MARGAREE HATCHERY

*J. W. Heatley, Superintendent*

The hatchery ponds produced 3,140,600 speckled trout eggs October 22 to November 16, which collection was supplemented by receipt of 1,852,000 Atlantic salmon eggs in November and December from Margaree salmon pond. Distributions for the season were 1,960,000 Atlantic salmon and 707,700 speckled trout, of which 1,000 trout one year old were marked by removal of the adipose and left pectoral fins and planted in Lake O'Law. Through the year 133 recaptures of marked trout were reported, 3 from Egypt brook, 51 from Ingraham brook and 79 from Plaster ponds. In 1944 there were 150 recaptures. In selective breeding 35 pairs of 3 year speckled trout yielded 2,285 eggs per female as against 1,172 in the general group of the same age. Eighteen new dams were built in the ponds—9 in series "S" and 9 in series "A". Pond 3 in series "B" was completely rebuilt with concrete ends and sides of grouted stone and concrete. Hydro-electric energy was installed in the buildings in October. Repairs were made to the garage and 14 troughs built as replacements. Good angling was reported in the district, particularly in Lake O'Law, Margaree and North Rivers. Splendid co-operation was received from the Fishery Supervisor and his staff.

## MARGAREE SALMON-RETAINING POND

*J. P. Chiasson, Superintendent*

In accordance with the usual practice, the salmon for this pond were purchased from the Margaree Harbour Salmon Fisheries Association. Preparations began September 15 and consisted of timbering, painting and caulking the boat, cleaning ponds, repairing wire fence and roof of the spawning shed. The net was fished continuously from September 26 to October 18 taking 835 salmon averaging 9.3 pounds. Eight hundred were impounded and 35, including 10 grilse, were released at the trap. From 788 stripped November 16 to December ten, 4,476,400 eggs were taken and allotted, 1,124,400 to Lindloff, 500,000 to Yarmouth, 1,000,000 to Middleton and 1,852,000 to Margaree hatchery. This was the largest collection made here since 1942.

## MERSEY RIVER REARING PONDS

*C. E. Harding, Officer-in-Charge*

Between June 6 and 16 fifty thousand speckled trout fingerlings and 225,000 Atlantic salmon advanced fry were received, the former from Middleton and the latter from Bedford hatchery. The output for the season was 107,500 salmon and 44,400 trout, some of the latter measuring  $7\frac{1}{2}$  inches long when liberated. The bridge, floors of camp and verandah were painted, some repairs made to pockets in ponds and a bedroom and office added to the rear of the camp building. Larger numbers of smolt than usual were observed migrating to salt water from the Mersey River and some improvement in trout angling in brooks stocked from Mersey was noted. Considerable assistance was rendered throughout the season by the Fisheries Committee of the local Fish and Game Association, local sportsmen, Fishery Inspectors and members of the staff of the Nova Scotia Power Commission.

## MIDDLETON HATCHERY, STEVENS PONDS AND NICTAUX REARING STATION

*F. M. Millett, Superintendent*

Eggs received during the year were—in February, 1,000,000 speckled trout from Antigonish, and 100,000 salmon trout from the Department of Game and Fisheries, Ontario, via their Sault Ste. Marie hatchery; in May, 8,000 rainbow trout from Saint John, and in November, 1,000,000 Atlantic salmon from Margaree salmon pond. In May, Stevens pond received 1,276,700 Atlantic salmon fry from Nictaux. Outgoing shipments of eggs consisted of 918,600 Atlantic salmon March 21 to Nictaux and of young fish, 105,000 speckled trout May 16-18 to Kejimikujik, and 50,000 same species June 6-7 to Mersey. Distributions for the season were 700,400 speckled trout, 770,000 Atlantic salmon, 69,000 salmon trout and 5,300 rainbow trout; of these 3,900 speckled trout for Elliott Lake and 3,880 rainbow trout fingerlings for Runsey Lake were marked fish. One new barrier was built at Stevens ponds between number 3 and the lower barrier, and the walks were regravelled and repaired. A new ceiling was placed in the dining room of the dwelling, some painting and redecorating done and additional shelving installed for files. Fishery Inspectors were willing to supply information desired on local waters and anglers reported trout fishing in the district very good with salmon fishing in the Lahave River better than had ever been known.

Nictaux rearing station was opened March 20 to receive next day 918,600 Atlantic salmon eggs from Middleton. It also received 602,000 eggs of the same species from Cobequid via Middleton on April 4. The eggs were incubated and fry reared until May 8-10, when one million, two hundred and seventy-



six thousand, seven hundred were transferred to Stevens ponds and the balance, 25,000, distributed in the Nietaux River. The roofs of the hatchery, food shed and watchman's building were repaired, new concrete supports made for all troughs and tanks, and one new foot trough constructed.

#### YARMOUTH HATCHERY

*F. F. Annis, Superintendent*

The hatchery ponds October 29—November 15 produced 156,100 speckled trout eggs. Additional eggs received were in January and February, 950,400 speckled trout from Cape Cod Trout Company via Rainbow Ranch, 1,000,000 same species from Antigonish, 400,000 Atlantic salmon from Kelly's, and in November, 984,400 speckled trout from Saint John and 500,000 Atlantic salmon from Margaree salmon pond. In May and June, 500,000 Atlantic salmon fingerlings were supplied to Kejimikujik rearing station. Distributions from Yarmouth amounted to 180,000 Atlantic salmon and 1,022,700 speckled trout of which 1,253 trout yearlings and older were marked by removal of the adipose and right ventral fins and distributed 486 in Joe-a-re Lake, 662 Tait Lake, 53 Goudey Lake and 52 Sloan Lake. In selective breeding 5 pairs of 2 year old speckled trout yielded 1,498 eggs per female as against 875 per female in fish of the same age in the general group. Three long ponds were given new concrete bottoms, buildings were painted, drives regravelled and grounds improved generally. The hatchery truck assisted in making distributions from Kejimikujik and Mersey rearing stations. Reports of angling conditions as regards numbers of trout and salmon available were very good. The Fisheries Supervisor rendered or arranged for assistance through his staff whenever their work would permit. Some of the local citizens also were very helpful when distributions were being made.

#### CHARLO HATCHERY

*R. O. Barrett, Superintendent*

Stripping operations at the hatchery ponds October 28—November 19 yielded 389,700 speckled trout eggs which collection was supplemented by receipt of 700,000 Atlantic salmon eggs in March from Miramichi hatchery and 1,341,000 same species in October and November from New Mills salmon pond. Distributions for the season were 1,877,750 Atlantic salmon and 14,200 speckled trout of which 763 trout one year old were marked by the removal of the adipose and left or right pectoral fins and distributed 243 in Charlo River, 260 in Black Lake and 260 in Loc Lomond. In selective breeding 13 pairs of speckled trout 4 years old yielded 3,793 eggs per female as against 1,999 per female of the same age in the general group. Two circular ponds were lined with 3 inches of cement which completes the relining of all circulars. The brood stock pond and the roof of the dwelling were repaired. The woodwork inside the main and sub-hatcheries, the feed room and verandah floor were painted, some shade trees set out, wooden slat screens made and grounds improved generally. Good fishing continued in Henry's Lake.

#### FLORENCEVILLE HATCHERY

*J. M. Butler, Superintendent*

The hatchery ponds October 17—November 26 produced 1,308,000 speckled trout eggs which is more than double the collection of last year. These ponds although not as productive as in the early nineteen forties have shown a steady improvement in production since 1943. Operations at Clinch brook, York County, which have been suspended since 1941, were resumed. In all 353 fish



were taken of which 140 females between October 24 and November 12 yielded 132,800 sebago salmon eggs. Of the 353 taken 23 or 6.5 per cent were marked fish. In 1944 seventy-six marked trout were recaptured at various points. Receipt of eggs from other sources were in March, 1,000,000 Atlantic salmon from Miramichi hatchery and 500,000 speckled trout from Antigonish, and in October and November, 806,000 Atlantic salmon from Miramichi pond and 1,011,150 speckled trout from Saint John. Distributions for the year were 1,532,300 speckled trout, 1,625,500 Atlantic salmon and 48 sebago salmon of which the last-mentioned, 5 years of age, and 500 trout, were marked before liberation by removal of the adipose and left pectoral fins. The marked sebgos were planted in Skiff Lake and the marked trout 400 in Bennett Lake and 100 in Johnville Beaver pond. In selective breeding 6 pairs of 4 year old speckled trout yielded 2,072 eggs per female as against 973 in the general group of the same age. Twenty-five pond shades were constructed for the long ponds and electric lighting was extended to the supply dam. Increased numbers of Atlantic salmon, sebago salmon and speckled trout were reported on the spawning grounds and angling is said to be much improved in Bennett Lake, Joslin or Waterloo Lake, Bulls, Hagerman and Burnt Land brooks. The very best of co-operation, including help with the distributions, was received from the Fredericton and McAdam Branches of the Fish and Game Association, also from the District Supervisor, Fishery Inspector, and many game and fish wardens and guides.

#### GRAND FALLS HATCHERY

*W. A. McCluskey, Superintendent*

In January, 1,017,800 speckled trout eggs were received from Cape Cod Trout Company via State Fish Hatchery, Libby, Montana; in March, 1,000,000 Atlantic salmon from Miramichi and 600,000 speckled trout from Antigonish; and in October and November, 718,300 Atlantic salmon from Miramichi salmon pond and 2,503,800 speckled trout from Saint John hatchery. Distributions for the season were 1,780,000 Atlantic salmon and 1,272,700 speckled trout. Salmon and trout were reported quite plentiful on the spawning grounds. The hatchery truck assisted for approximately two months in making fall distributions from the Saint John hatchery. The Madawaska and Grand Falls branches of the Fish and Game Association gave splendid assistance in making distributions.

#### MIRAMICHI HATCHERY AND SALMON-RETAINING POND

*Frank Burgess, Superintendent*

In March, 200,000 speckled trout eggs were received from Saint John hatchery and in October and November, 6,520,100 Atlantic salmon from the Miramichi salmon pond. Outgoing shipments of Atlantic salmon eyed eggs in March were 50,000 to Crown Point, New York, 120,000 to Glenora hatchery, Belleville, Ontario, 100,000 to Hill Lake rearing station, Englehart, Ontario, 1,000,000 to Florenceville, 1,000,000 to Grand Falls and 700,000 to Charlo. Distributions for the season amounted to 3,335,200 Atlantic salmon and 137,800 speckled trout. More Atlantic salmon were reported on the spawning grounds this year than last. Fly fishing was good in all branches of the Miramichi River and the drift and set-net fishermen had a fair season in this river and its tributaries.

The parent salmon for the Miramichi pond were purchased as usual by tender and contract, and from September 10 to 30 one thousand, seven hundred and seventy-one fish averaging 8.6 pounds in weight were impounded. Between October 20 and November 7, one thousand and fifty-five females were stripped, yielding 8,044,400 eggs, which were allotted 6,520,100 to Miramichi, 718,300 to Grand Falls and 806,000 to Florenceville hatchery.

## NEW MILLS SALMON-RETAINING POND

*William White, Superintendent*

Between May 24 and July 18 three hundred and eighty-seven salmon averaging 14.6 pounds were purchased from 13 commercial fishing stands of the district, delivered and impounded at the New Mills pond. At spawning time October 23-November 8, one hundred and eighty-seven females yielded 1,341,000 eggs which were all laid down for incubation in the Charlo hatchery. Only 8 salmon were lost during the retention period from May to November. A hardwood floor was laid in the living quarters and a new sill placed under the East side of the building.

## SAINT JOHN HATCHERY

*K. G. Shillington, Superintendent*

The hatchery ponds produced in November and December 11,646,550 speckled trout eggs which were allotted 7,147,200 to Saint John, 1,011,150 to Florenceville, 2,503,800 to Grand Falls and 984,400 to Yarmouth. One million, ninety-eight thousand of the Saint John allotment were planted as green eggs in Little River. The ponds also produced 40,500 rainbow trout eggs in April and May and 11,500 Atlantic salmon eggs in November and December. In 1944 parent Atlantic salmon four years old which had never been to sea and had been retained in the hatchery ponds since the eggs were hatched produced 6,500 eggs of which 50 per cent later hatched. Again this year 1945 these parent salmon, now five years old, yielded 11,500 eggs. The fry and fingerlings resulting from the 1944 yield grew much better than the progeny of the eggs secured from sea-going Atlantic salmon parents. Both lots of fingerlings having been reared through the summer were weighed on October 6, at which time those from the pond stock averaged .259 ounces each, whereas the fingerlings from wild sea-going stock averaged only .091 ounces. Besides the collections from the ponds mentioned above, the following eggs were received, 990,600 Atlantic salmon from Cobequid in March, 68,000 sebago salmon from Chamcook Lakes in November, and 4,000 same species from Gibson Lake, also in November. Outgoing shipments of eggs in addition to those already stated were 1,000,000 speckled trout to Kelly's pond hatchery in March, 200,000 same species to Miramichi same month, and 8,000 rainbow trout to Middleton in May. Distributions for the season were 843,400 Atlantic salmon, 27,600 sebago salmon, 2,150,200 speckled trout, and 7,700 rainbow trout. Six thousand, five hundred and seventy-five of the sebagos one to two years old, 12 rainbows four years, and 7,538 speckled trout, fingerlings to two years old, were marked by fin clipping before being planted—all sebagos in Chamcook Lake, all rainbows in Little River, and the speckled trout in the following lakes: 3,808 in Balls; 1,518 Gibson; 1,200 Welch; 812 Crecy and 200 Taylor. Some of the speckled trout fingerlings made excellent growth and averaged 2.3 ounces in weight by October 30. In selective breeding 20 pairs of speckled trout 2 years old yielded 3,414 eggs per female as against 1,545 per female in the general group of the same age. The 8 inch wood pipe laid in the fall of 1944 was connected temporarily to the outside troughs for the summer, the drain was filled in during the spring, and gravel hauled on the ice of the pond for placing under the supply pipes. The East end of the hatchery was repaired, one new pond walk renewed, and the remainder repaired where necessary. The spring brook was cleaned out and four dams constructed to make three ponds. Necessary changes were made to the old stands of the outside troughs so that a few of the new troughs can be set up. Excellent fishing was reported from Little River below the hatchery and large numbers of rainbow trout from Big Salmon River.

Encouraging reports of improved fishing due to hatchery distributions generally were received. Some inside painting was done to the hatchery and dwelling. Splendid co-operation was received from the Saint John, St. Stephen, McAdam, Fredericton Junction, Grand Lake, Sussex and Moncton branches of the Fish and Game Association. In the fall distributions the Saint John branch supplied trucks, cars and men for the work. The Sussex branch, besides distributing most of the fish delivered to Sussex, sent seven trucks to the hatchery and distributed fingerlings in that district.

Operations at Chamcook and Gibson Lakes were carried on with the assistance of the District Supervisors of Fish Culture and under their general supervision. At Chamcook between October 20 and November 19, one hundred and thirty-one sebago salmon were taken, 85 females of which yielded 68,000 eggs. This collection is an increase of approximately 42,000 over the previous year and over five times the collection of 1943. Of 131 seabagos taken 107 or 81·7 per cent bore the hatchery markings. Last year at this place 75 per cent bore the hatchery markings. At Gibson Lake only 20 seabagos were taken, 3 of which were females yielding 4,000 eggs. Five of the 20 or 25 per cent bore the hatchery marks, i.e., removal of adipose and left ventral fins. Last year 48 per cent bore hatchery markings at this camp. Eggs from both camps were transferred to Saint John hatchery for incubation.

#### CARDIGAN REARING PONDS

##### *C. Sayer, Superintendent*

Between May 10 and 15 Kelly's pond hatchery supplied 740,600 speckled trout and 162,000 Atlantic salmon advanced fry from which 252,500 trout and 138,700 salmon fingerlings were later distributed. The supply dam was resheathed and new crib logs set. Dead trees and brush along the pipe line were cut out and burned, area around two ponds resodded, some filling of low places on the lawns done, steps, two pond frames, and some fence posts renewed, front porch, feed room and fences painted, and grounds improved. Fishing was reported very good in Glenfinnan and O'Keefe's Lakes and angling good generally. Assistance was given the Fisheries Research Board workers as desired.

#### KELLY'S POND HATCHERY AND MORELL RIVER SALMON-RETAINING POND

##### *C. A. Tait, Superintendent*

A collection of 214,000 speckled trout eggs was made from the hatchery supply pond November 5-December 27 and 7,160 eggs of the same species were secured from fish at Simpson's pond. Freshets which covered the trap and fence several times militated against a larger collection being made at the latter point. In 1944 the adipose fin was clipped from all female fish stripped at the hatchery pond. The present year 444 trout were captured and marked by removal of the right ventral fin. Approximately 60 per cent of the females stripped had the adipose fin missing. Other eggs received were 1,000,000 speckled trout from Saint John hatchery in March and 1,294,600 Atlantic salmon from Morell pond in November. Outgoing shipments were in February 400,000 Atlantic salmon eggs to Yarmouth, and in May 740,600 speckled trout and 162,000 Atlantic salmon advanced fry to Cardigan rearing station. Distributions for the season were 404,900 Atlantic salmon and 339,100 speckled trout. Three new hatching troughs were constructed and temporary repairs made to the deck of the dam. Very good angling was reported from many parts of the district with Atlantic salmon being more plentiful in the Morell River than the previous year. The hatchery staff assisted members of the Fisheries Research Board in their experimental work during the summer.



Assistant C. H. Cooper was in charge of the salmon retaining pond at the Morell River where 527 salmon averaging  $8\frac{1}{2}$  pounds in weight were impounded between October 12 and November 8. Sixty-eight per cent of the fish were males but from 161 females stripped November 7-24 a yield of 1,294,600 eggs was secured for Kelly's pond hatchery. One of the fish taken on October 31 bore tag number K.3598, had a length of  $37\frac{1}{2}$  inches and weight of 18 pounds. When originally marked and liberated in the Morell River November 19, 1943, it had a length of 31 inches and a weight of 8 pounds after stripping. Minor repairs were made to the wharf, scow and dam.

*Receipts, Shipments and Purchases Generally*

The receipt of 100,000 salmon trout eggs from the Ontario Department of Game and Fisheries is gratefully acknowledged. Outgoing shipments of Atlantic salmon eggs consisted of 50,000 to the Fish and Wildlife Service, Washington, D.C., and 220,000 to the Ontario Department above mentioned. Three million seven hundred and sixty thousand five hundred speckled trout eggs were purchased from the Cape Cod Trout Co., Wareham, Mass., and 7,160 from Nelson Simpson, Bay View Mills, P.E.I.



## STATEMENT BY SPECIES OF LOCAL COLLECTION AND DISPOSAL OF EGGS DURING 1945

Species	Collection area	Eggs collected	Number collected	Disposal—Establishment at	Eggs received	Number	Totals
Atlantic salmon	Margaree pond, N.S.	Nov. 10-Dec. 10.	4,476,450	Lindloff.	Nov. 22.	1,124,410	
				Margaree.	Nov. 17-Dec. 11.	1,852,040	
				Middleton.	Nov. 28.	1,000,000	
Rainbow trout.	River Philip, N.S.	Nov. 15-20.	1,025,700	Yarmouth.	Nov. 29.	500,000	
	Sackville River, N.S.	Nov. 1-16.	845,360	Cobequid.	Nov. 15-21.	1,025,700	
				Bedford.	Nov. 1-16.	815,360	
Rainbow trout.	Miramichi pond, N.B.			Dalhousie University, Halifax, N.S.			
		Oct. 20-Nov. 7.	8,044,370	Florenceville.	Oct. 26.	30,000	
				Grand Falls.	Oct. 26.	805,920	
	New Mills pond, N.B.			Miramichi.	Oct. 21-Nov. 8.	718,320	
		Oct. 23-Nov. 8.	1,340,950	Charlo.	Oct. 24-Nov. 9.	6,520,130	
		Nov. 7-24.	1,294,600	Saint John.	Nov. 12-Dec. 3.	1,940,950	
	Saint John hatchery ponds, N.B.	Apr. 14-May 4.	40,500	Kelly's pond.	Nov. 7-24.	11,500	
		Nov. 6-27.	14,160	Saint John.	Apr. 14-May 4.	1,294,600	17,038,930
		Nov. 9-22.	171,700	Grand Lake.	Nov. 6-27.	40,500	40,500
	Charnock Lakes, N.S.	Nov. 6-27.	68,000	Grand Lake.	Nov. 6-27.	14,160	
Speckled trout.	Clinch brook, York County, N.B.	Nov. 9-22.	132,840	Saint John.	Nov. 9-22.	171,700	
	Gibson Lake, Charlotte County, N.B.	Oct. 24-Nov. 12.	4,000	Florenceville.	Oct. 24-Nov. 12.	68,000	
	Antigonish hatchery ponds, N.S.	Oct. 31-Nov. 29.	9,629,810	Saint John.	Nov. 22.	132,840	
	Bedford hatchery, N.S.	Nov. 12-Dec. 6.	(a) 2,238,800	Antigonish.	Oct. 31-Dec. 6.	11,868,610	390,700
	Lindloff hatchery ponds, N.S.	Nov. 5.	21,700	Bedford.	Nov. 5.	21,700	
	McRae Lake, Richmond County, N.S.	Oct. 30-Nov. 20.	541,680	Lindloff.	Oct. 30-Nov. 26.	1,513,180	
	Margaree hatchery ponds, N.S.	Oct. 5-20.	194,760	Lindloff.	Oct. 5-20.	194,760	
	Yarmouth hatchery ponds, N.S.	Oct. 22-Nov. 16.	2,527,010	Margaree.	Oct. 22-Nov. 16.	3,140,580	
	Charlo hatchery ponds, N.B.	Nov. 12-16.	(a) 613,570	Yarmouth.	Oct. 28-Nov. 15.	156,110	
	Florenceville hatchery ponds, N.B.	Oct. 29-Nov. 15.	156,110	Charlo.	Oct. 28-Nov. 19.	389,720	
Southport (Kelly's Pond) hatchery pond, P.E.I.		Oct. 17-Nov. 26.	1,307,960	Florenceville.	Oct. 17-Nov. 26.	1,307,960	
		Nov. 5-23.	9,442,550	Yarmouth.	Nov. 24.	984,400	
		Nov. 28-Dec. 4.	(a) 2,204,000	Florenceville.	Nov. 23.	1,011,150	
				Grand Falls.	Nov. 15, 19.	2,503,800	
		Nov. 5-Dec. 27.	213,980	Saint John.	Nov. 5-Dec. 4.	7,147,200	
				Kelly's Pond.	Nov. 5-Dec. 27.	213,980	30,453,150
							47,923,280

(a) eggs from yearling fish.

IN THE INTEREST OF ECONOMY AND CONVENIENCE IN DISTRIBUTION THE FOLLOWING TRANSFERS WERE MADE IN 1945:—

Species	From	To	Eyed Eggs		Fry		Fingerlings	
			Number	Date received	Number	Date received	Number	Date received
Atlantic Salmon	Bedford	Grand Lake			225,000	June 9-16	345,000	June 19-22
	Bedford	Mersey						
	Cobequid	Antigonish	1,005,840	Mar. 22				
	Cobequid	Nictaux	601,980	April 4				
	Cobequid	Saint John	990,600	Mar. 28				
	Middleton	Nictaux	918,600	Mar. 21				
	Nictaux	Middleton			1,276,680	May 8-10		
	Yarmouth	Kejimikujik						
	Miramichi	Charlo	700,000	Mar. 22				
	Miramichi	Florenceville	1,000,000	Mar. 10			500,000	May 28-June 15
	Miramichi	Grand Falls	1,000,000	Mar. 16				
	Kelly's Pond	Yarmouth	400,000	Feb. 23				
	Kelly's Pond	Cardigan			162,000	May 15		
	Saint John	Middleton	8,000	May 24				
Rainbow trout. Speckled trout.	Antigonish	Bedford	500,000	Feb. 24				
	Antigonish	Cobequid	1,000,000	Mar. 22				
	Antigonish	Grand Lake					40,000	Sept. 24-Oct. 1
	Antigonish	Lindlof	1,500,000	Mar. 8				
	Antigonish	Middleton	1,000,000	Feb. 9				
	Antigonish	Yarmouth	1,000,000	Feb. 25				
	Antigonish	Florenceville	500,000	Mar. 17				
	Antigonish	Grand Falls	600,000	Mar. 31				
	Bedford	Coldbrook			371,040	May 21-26		
	Bedford	Coldbrook					35,000	June 6
	Middleton	Kejimikujik					105,000	May 16-18
	Middleton	Mersey					50,000	June 6-7
	Saint John	Miramichi	200,000	Mar. 9				
	Saint John	Kelly's Pond	1,000,000	Mar. 8				
	Kelly's Pond	Cardigan			740,620	May 10-14		

## EGGS, FRY, FINGERLINGS AND OLDER FISH ON HAND, END OF CALENDAR YEAR 1945

Establishment	Species	Eggs	Fry	Fingerlings	1 year	2 year	3 year	4 year	5 year and older	Total by species	Total by hatchery
Antigonish.....	Speckled trout.....	11,560,670		18,000	4,025	8,129				11,590,824	11,590,824
Bedford.....	Atlantic salmon.....	679,570								679,570	
	Speckled trout.....	10,300								10,300	689,870
Cobequid.....	Atlantic salmon.....	1,023,410		32,172						1,023,410	
	Speckled trout.....									32,172	1,055,582
Grand Lake.....	Sabago salmon.....	134,210		33,870	1,500	1,000	401	185	20	171,186	
	Speckled trout.....			39,975						39,975	211,161
Limuloff.....	Atlantic salmon.....	1,115,750								1,115,750	
	Speckled trout.....	1,399,460	70,000	3,000	2,701	747				1,475,908	2,591,658
Margaree.....	Atlantic salmon.....	1,758,600								1,758,600	
	Speckled trout.....	2,123,310		5,008	7,540	3,372				2,139,230	3,897,830
Middleton.....	Atlantic salmon.....	986,200								986,200	986,200
Yarmouth.....	Atlantic salmon.....	475,690								475,690	
	Speckled trout.....	797,710		2,210	174	105	133	80		800,412	1,276,102
Charlo.....	Atlantic salmon.....	1,279,340								1,279,340	
	Speckled trout.....	296,310			600			270		297,380	1,576,720
Florenceville.....	Atlantic salmon.....	774,780		29,380						804,160	
	Sabago salmon.....	119,940								119,940	
	Speckled trout.....	1,905,840		21,492	7,282	5,174	497	369		1,940,654	2,864,754
Grand Falls.....	Atlantic salmon.....	698,820								698,820	
	Speckled trout.....	1,771,550								1,771,550	2,470,370
Miramichi.....	Atlantic salmon.....	6,329,040								6,329,040	6,329,040
Saint John.....	Atlantic salmon.....	4,520		3,600					17	8,137	
	Sabago salmon.....	69,960		4,454						74,414	
	Rainbow trout.....			1,004				23		1,035	
	Speckled trout.....	4,561,520		34,820	4,252	3,834				4,604,426	4,688,012
Kelly's Pond.....	Atlantic salmon.....	1,195,420								1,195,420	
	Speckled trout.....	199,100								199,100	1,394,520
		41,271,220	70,000	228,985	28,074	22,361	1,031	927	45	41,622,643	41,622,643

## DEPARTMENT OF FISHERIES

## DISTRIBUTIONS

## KEY TO ABBREVIATIONS

*Species*

- A. Atlantic salmon.
- B. Brown trout.
- G. Salmon trout.
- K. Kamloops trout.
- R. Rainbow trout.
- L. Landlocked or Sebago salmon.
- S. Speckled trout.

*Stages of Development*

- a. Green eggs.
- b. Eyed eggs.
- c. Fry.
- d. Advanced fry.
- 1. No. 1 Fingerlings.
- 2. No. 2 Fingerlings.
- 3. No. 3 Fingerlings.
- 4. No. 4 Fingerlings.
- 5. No. 5 Fingerlings.
- f. Yearlings.
- g. Two years.
- h. Three years.
- k. Older fish.

## CLASSIFICATION

Advanced fry: Fish for a period of two weeks following the complete absorption of the yolk sac.

Fingerlings:

- No. 1. From two to eight weeks after complete absorption of the yolk sac.
- No. 2. From eight to fourteen weeks after complete absorption of the yolk sac.
- No. 3. From fourteen to twenty weeks after complete absorption of the yolk sac.
- No. 4. From twenty to twenty-six weeks after complete absorption of the yolk sac.
- No. 5. From twenty-six weeks to one year from date of hatch.

## NOVA SCOTIA

## ANTIGONISH HATCHERY

*Antigonish County—*

- Afton River—40,000 S1.
- Beaver Meadow River—40,000 S1, 20,000 S2, 2,500 S3.
- Big brook—South River—30,000 Sd, 15,000 S2.
- Black River—60,000 S1.
- Brierly brook—20,000 S1.
- Cameron Lake—West River—15,000 S2.
- Copper Lake—260 Sf.
- Delhanty Lake—40,000 S1.
- Gaspereaux Lake—30,000 S1, 473 Sh.
- Glenroy River—20,000 Sd, 35,000 S1, 10,000 S2.
- James River—110,000 A1.
- Maryvale or Malignant brook—40,000 S1.
- McMillan Lake—10,000 S2.
- Meadow Green River—30,000 Sd, 35,000 S1, 10,000 S2.
- Middleton Lake—50,000 S1.
- North Lake—50,000 S1.
- North River—10,000 S2.
- Pinevale brook—20,000 Sd.
- Pinevale Lake—30,000 Sd.
- Polson brook—South River—30,000 S1.
- Rights River—60,000 A1.
- St. Joseph Lake—15,000 S1, 500 Sf.
- South Lake—40,000 S1.
- South River—65,000 A1, 110,000 S1, 10,000 S2, 1,170 S4, 740 Sf.
- Springfield brook—Glenroy River—30,000 Sd.
- West River—80,000 S1, 40,000 S2, 2,500 S3, 4,200 S4, 1,025 Sf, 600 Sg.

*Cumberland County—*

- Sutherland Lake—1,250 Sf.

*Guysborough County—*

- Big Brook Lake—2,000 S4.
- Canter Lake—60,000 S1.
- Cocee Coffre Lake—60,000 S1.
- Country Harbour River—60,000 A1.
- Cudahys Lake—20,000 S1, 2,500 S3.
- Dobson Lake—110,000 S1.
- Donahue Lake—100,000 S1, 500 Sf.
- Doyle Lake—30,000 S1.
- Ecumsecum River—60,000 S1.
- Eight Island Lake—50,000 S1.
- Fitzgerald Lake—30,000 S1, 2,500 S3.
- Giant Lake—80,000 S1, 20,000 S2.
- Goldboro or Goldbrook Lake—30,000 S1.
- Goshen Lake—10,000 S1.
- Guysborough River—40,000 S1.
- Hazel Hill Lake—40,000 S1.
- Hydro dam, Havre Bouche River—60,000 S1.
- Indian Harbour Lake—30,000 S1.
- Jellow Lake—90,000 S1, 5,000 S2, 3,000 S3, 600 Sf.
- Kennedy Lake—35,000 S1.
- Mannassette Lake—50,000 S1.
- McInnis (Joe's) Lake—30,000 S1.
- MacIntosh Lake—3,000 S3.
- McPherson Lake (Port Shoreham)—65,000 S1.
- Morrison Lake—20,000 S1.
- Narrow Lake—50,000 S1.
- Porter River—50,000 S1.
- Pringle Lake—300 Sh.
- East River St. Mary—100,000 Ad, 120,000 A1.
- West River St. Mary—220,000 A1.
- Salmon River—40,000 A1, 50,000 S1.



*Guysborough County—Con.*

Seal Harbour Lake—50,000 S1.  
 Sherbrook Lake—70,000 S1, 400 Sf.  
 Sullivan Lake—40,000 S1.  
 Taylor Lake—East River St. Mary—20,000 S1.  
 Three Mile Lake—40,000 S1.  
 Tracadie River—20,000 A1.  
 Two-mile Lake—East River St. Mary—30,000 S1.  
 Yank Lake—3,000 S3.

*Halifax County—*

Dalhousie University—50 Sg., 30 Sh.  
 Round Pond (Smith Settlement)—478 Sf.

*Pictou County—*

Barney River—60,000 A1, 30,000 S1.  
 Ben Lake—2,500 S4.  
 Big brook—East River—10,000 S2.

Blue Mountain dam, French River—5,000 S2.  
 Brora Lake—25,000 S2.  
 Calder Lake—25,000 S2.  
 Campbell Lake—French River—20,000 S2.  
 East River—70,000 A1, 70,000 S1, 20,000 S2.  
 French River—30,000 A1.  
 French River branch (French River Settlement)—20,000 S1.  
 Lansdowne Lake—20,000 S2.  
 Little Caribou River—20,000 S2.  
 McLellan brook—35,000 S1.  
 McPherson Lake—25,000 S2.  
 Middle River—30,000 A1.  
 Porcupine Lake—3,000 S4.  
 Sixmile brook—20,000 S1, 5,000 S2.  
 Sutherland River—30,500 S1.  
 West branch brook—East River—20,000 S1, 10,000 S2.  
 West River—60,000 S1, 20,000 S2.

## BEDFORD HATCHERY

*Halifax County—*

Black Point Lake—53,700 S1.  
 Drain Lake—520 S2.  
 Flat Lake—St. Margaret Bay—28,000 S1.  
 Halfway brook—Sheet Harbour—35,000 S1.  
 Jack Lake (Bedford Basin)—4,400 S2.  
 Lewis Lake—East River—45,000 S1.  
 Little Sackville River—30,000 Sd.  
 Little Sackville brook—20,000 Sd.  
 Long Lake—Hosier River—25,000 S1.  
 Maxwell Lake—Sackville River—60,000 S1.

Moose brook—Scraggy Lake—28,000 S1.  
 Oyster Pond—35,000 S1.  
 Shel Drake Lake—28,000 S1.

*Hants County—*

Bog brook—Coxcomb or Cocksecomb Lake—28,000 S1.  
 Lily Lake—Meander River—28,000 S1.  
 Nix Lake—28,000 S1.

*Lunenburg County—*

Gold River, upper—14,570 A3.

## COBEQUID HATCHERY

*Colchester County—*

Carter Lake—2,000 S2.  
 Chain Lake brook—Economy River—5,000 S2.  
 Chiganois River—23,000 S1, 12,000 S2.  
 Debert River—12,000 S2.  
 East River, at Five Islands—25,000 S1.  
 Economy Lake—9,000 S1.  
 Economy River—23,000 Ad.  
 French River—18,000 S1, 10,000 S2.  
 Great Village River—18,000 Ad.  
 Newton Lake—9,000 S1.  
 North River, near Truro—50,000 A1.  
 Portapique River—23,000 Ad.  
 Salmon River—50,000 A1.  
 Shatter Lake—5,000 S2.  
 Silica Lake or Bass River Lake—5,000 S1, 5,000 S2.  
 Simpson Lake—18,000 S1, 6,000 S2.  
 Waughs River—25,000 S1, 10,000 S2.  
 West Branch Lake—River Philip—5,500 S2.

*Cumberland County—*

Amherst Pond (Reservoir) Nappan River—10,000 S1, 3,000 S2.  
 Atkinson brook—River Herbert—4,000 S1.  
 Black River—10,000 S2.  
 Black Lake—15,000 A2.  
 Brownell brook—Shinimikas River—10,000 S1.  
 Coulter Lake, upper—2,500 S2.  
 Cumberland Railway Reservoir—River Herbert—3,500 S2.

Dead Lake—4,000 S1.  
 Fountain Lake—6,000 S1.  
 Fox River (Greville Bay)—23,000 S1.  
 Gilbert Lake—5,000 S2.  
 Isaac Lake—8,000 S1.  
 Leak Lake—5,000 S1.  
 Little Lake—Newfound Lake—3,500 S1.  
 Maccan River—23,000 Ad, 23,000 A1, 40,000 S1, 10,500 S2.  
 McAloney Lake—10,500 S1, 4,000 S2.  
 McLeod Lake—5,000 S1.  
 Newfound Lake—12,000 S1.  
 Otter Lake—Portapique River—4,000 S1.  
 Parrsboro Aboiteau—8,000 S1.  
 Poison Lake—4,000 S1.  
 Polly brook—5,000 S2.  
 Pugwash River—28,000 S1.  
 Ramshead River—16,000 S1.  
 Ramshead Lake—10,000 S1.  
 River Philip—38,000 Ad, 43,000 A1, 3,400 A2, 12,000 S2.  
 River Philip, west branch—10,000 S2.  
 River Philip, east branch—30,000 Ad, 1,650 S1, 8,000 S2.  
 Shinimikas River—23,000 Ad, 7,000 S2.  
 Shulie River—10,000 S1.  
 Smith's Pond—Polly brook—3,000 S1.  
 Springhill Lake—4,000 S1.  
 Sugarloaf brook—10,000 S2.  
 Tidnish River—12,000 Ad, 8,000 S2.  
 Tillies brook—15,000 S1.

*Cumberland County—Con.*

Vickery Lake—7,000 S2.  
Wallace River—45,000 Ad, 43,000 S1,  
10,000 S2.  
Wallace River, west branch—12,000 S2.  
Webb Lake—4,000 S1.  
Welton Lake—6,000 S1.

*Westmorland County—*

Calhoun brook-Silver Lake or Morice Pond  
—6,000 S2.

Carter brook-Westcock creek—3,500 S2.  
Fawcett brook-Silver Lake or Morice  
Pond—4,500 S2.  
Gaspereau River—20,000 A1.  
Jenks brook-Tantramar River—5,500 S1.  
North brook-Musquash Lake—8,250 S1.  
North River—21,000 A2.  
Pollett River—85,000 A2.  
Robinson brook-Tantramar River—11,000  
S1.  
Walt Spence brook—8,000 S2.

## COLDBROOK PONDS

*Hants County—*

Hennigar's Lake—300 S2.

*Kings County—*

Annapolis River—20,000 S2.  
Armstrong Lake—10,000 S3.  
Aylesford Lake—20,000 S2, 6,000 S3.  
Brandywind brook-Cornwallis River—  
10,000 S2, 5,000 S3.  
Cambridge brook-Cornwallis River—  
10,000 S2.  
Canard River—12,000 S2, 4,000 S3.

Cornwallis River—10,000 S2, 5,000 S3.  
Crooked Lake—5,000 S3.  
Gaspereau Lake—10,000 S2, 16,000 S3.  
Habitant River—6,000 S3.  
Lake George—15,000 S2, 10,000 S3.  
Lake Paul—10,000 S3.  
Lake Torment—20,000 S2.  
Murphy Lake—10,000 S2, 8,000 S3.  
North River—15,000 S2, 5,000 S3.  
Simpson Lake—2,000 S1, 2,000 S2, 2,000 S3.  
Trout River—5,000 S3.  
Upper Sixty Lake—10,000 S3.

## GRAND LAKE PONDS

Fisheries Experimental Station, Halifax, N.S.  
—190 Af.

*Albert County—*

Petitcodiac River—125 Af, 125 Lf.

*Colchester County—*

Stewiacke River—15,000 A1, 5,000 Af.

*Halifax County—*

Beaverbank River—1,200 Af, 1,200 Lf.  
Chezzetcook River—20,000 A2.  
Conrod Lake—3,000 Sf.  
Eagle Lake-Partridge River—3,000 Sf.  
Fishing Brook Lake (Upper Musquodoboit)  
—1,000 Sf.  
Five Island Lake—3,000 Sf.  
Goose Lake-Porter Lake—1,800 Sf.  
Halfmile Lake—1,000 Sf.  
Henry Lake—2,000 Sf.  
Ingram River—20,000 A2, 6,000 Af.  
Little Salmon River-Cole Harbour—20,000  
A2.  
McGrath Lake—3,000 Sf.  
Meisner Lake—1,000 Sf.  
Mimie's Lake-Lake Thomas—1,000 Sf.  
Musquodoboit River—20,000 A1, 55 Af.  
Ninemile River—20,000 A1, 7,000 Af.

Pace Lake—2,500 Sf.  
Pockwock Lake—999 Sf.  
Rawdon River—3,620 Af, 3,620 Lf.  
Sackville River—20,000 A2, 6,000 Af.  
Salmon River (Port Dufferin)—20,000 A2.  
Salmon River-Echo Lake—20,000 A2.  
Sheehan Lake—1,000 Sf.  
Ship Harbour River—20,000 A2, 5,000 Af.  
Shubenacadie (Grand) Lake—7,000 Lf,  
20,100 Lf, 3,580 Lg, 2,895 Lh, 95 Lk.  
Sluice Lake—1,000 Sf.  
Tangier River—25,000 A2, 7,000 Af.  
Upper Petpeswick, Long Bridge or Bridge  
End Lake—3,000 Sf.  
West River Sheet Harbour—20,000 A1,  
5,800 Af.  
Williams Lake (North West Arm)—3,000  
Sf.

*Hants County—*

Cameron Lake—1,000 Sf.  
Kennetcook River—20,000 A1.  
Lewis Lake—1,000 Sf.

*Lunenburg County—*

Gold River—15,000 A1, 7,000 Af.  
Middle River—20,000 A2, 7,000 Af.  
Spondo Lake—1,500 Sf.

## KEJIMKUJIK PONDS

Lahave River and tributaries—135,000 A4.  
Medway River and tributaries—233,250 A4.  
Charlotte Lake—1,000 S5.  
Christopher brook—1,350 S2.  
Dolliver Lake (near Kempt)—500 S5.  
Freeman Lake—1,350 S2.  
Harmony Lake—2,620 S3.  
Murray brook—2,030 S2.  
Pleasant River—7,870 S3.  
Tupper Long Lake—5,250 S3.

Whiteburn brook—5,250 S3.  
Wildcat River—5,200 S2.  
Mersey River—  
Grafton brook—1,750 S3.  
Grafton Lake—5,250 S3.  
Kejimkujik Lake—8,480 S5.  
Little River—5,200 S2, 2,400 S5.  
Mersey River, upper—5,200 S2, 5,250 S3.  
Minard brook—2,630 S3, 1,350 S5.  
Minard Lake—5,250 S3.  
Westward River—5,200 S2, 5,600 S3.

## LINDLOFF HATCHERY

*Cape Breton County—*

Belfry Lake—30,000 S1.  
 Blackett Lake—28,000 S1, 2,000 Sf.  
 Canoe Lake—30,000 S1.  
 Catalogne Lake—30,000 S1.  
 Chain or String Lakes-Mira River—30,000 S1.  
 Cochran Lake—30,000 S1.  
 Dutch Brook Lake—30,000 S1, 1,200 Sf.  
 Gabarus Lake—30,000 S1.  
 Gaspereaux River—70,000 A1.  
 Grand Lake, near Louisburg—30,000 S1.  
 Hardy Lake—40,000 S1.  
 Loon Lake-Mira Bay—20,000 S1.  
 McCormick Lake—20,000 S1.  
 Meadow brook-Sydney River—51,000 S1.  
 Mullcuish Lake—30,000 S1.  
 Pottle Lake—2,000 Sf, 120 Sg.  
 Salmon River—70,000 A1, 90,000 A2.  
 Stewart Lake—30,000 S1.

*Inverness County—*

Brawley Lake—30,000 S1.  
 Horton Lake—30,000 S1, 1,200 Sf.  
 McIntyre Lake (Grantville)—32,000 S1, 2,277 Sf, 63 Sg.  
 Pleasant Hill Lake—20,000 S1.

*Richmond County—*

Black River—60,000 S1.  
 Breen Lake—17,220 S2.  
 Buchanan Lake—30,000 S1.

Falls Bay brook—5,000 S1.  
 Ferguson Lake—28,000 S1, 2,000 Sf.  
 Ferguson brook—12,000 S1.  
 Framboise River—70,000 A1.  
 Grand River—70,000 A1.  
 Indian Lake—30,000 S1.  
 Kytes Lake—20,000 S1.  
 Loch Lomond—140,000 A1, 45,000 A2.  
 Mary Ann's Lake—10,000 S2.  
 MacLeod brook—12,000 S1.  
 McIsaac Lake—18,000 S2, 2,000 Sf.  
 McKenzie Lake—40,000 S1.  
 McNab Lake—40,000 S1.  
 Mill Lake-East River Tillard—30,000 S1, 15,000 S2.  
 River Tillard, west—40,000 S1.  
 River Tillard, east—20,000 S1.  
 River Tom—20,000 S1.  
 Saint Esprit Lake—20,000 S1.  
 Sampson Lake—30,000 S1.  
 Scott brook—30,000 S1.  
 Straughton brook—12,000 S1.  
 Thompson Lake—10,000 S2.  
 Madame Island—  
 Babins Lake—35,000 S1.  
 Chain Lake—18,000 S1.  
 Forest Lake—40,000 S1.  
 Grand Lake—28,000 S1, 2,000 Sf.  
 Noels Lake—35,000 S1.  
 Potties Lake—32,000 S1.  
 Shaw Lake—48,000 S1.

## MARGAREE HATCHERY

*Cape Breton County—*

Black brook-Mira River—5,000 S1.  
 Ferguson Lake (New Boston)—5,000 S1.  
 Forester Lake—5,000 S1.  
 Giovonetti Lake—300 Sf.  
 Jackson or Johnson Lake—5,000 S1.  
 Kilkeny Lake—600 Sf, 400 Sg.  
 McDonald or Widow Lake (New Boston)—5,000 S1.  
 McInnes Lake—300 Sf.  
 McIntyre Lake (New Boston)—10,000 S1.  
 McPherson Lake (New Boston)—300 Sf.  
 Scotch or Scott Lake—300 Sf.  
 Trout brook-Mira River—300 Sf.

*Inverness County—*

Big brook-River Denys—40,000 S1.  
 Cheticamp River—50,000 Ad, 70,000 A1.  
 Farm brook—5,000 S1.  
 Galant River—35,000 S1, 300 Sh.  
 Glen brook-River Denys—15,000 S1.  
 Glenora brook—5,000 S1.  
 Grand Etang brook—15,000 S1.  
 Margaree River, northeast and tributaries—220,000 Ad, 520,000 A1, 240,000 A2.  
 Egypt brook—25,000 S1.  
 Forest Glen brook—25,000 S1.  
 Ingram (Ingraham) brook—354 Sf, 925 Sg.  
 Lake O'Law—1,000 Sf.  
 Levis brook—25,000 S1.  
 Watson brook—10,000 S1.

Margaree River, southwest—110,000 Ad, 140,000 A1.  
 Captain Allan's brook—35,000 S1.  
 Matheson Glen brook—25,000 S1.  
 McDonnell brook—15,000 S1.  
 McColl brook—250 Sf.  
 McPherson brook-River Denys—15,000 S1.  
 Mull River—100,000 A1.  
 Plaster ponds—800 Sg, 830 Sh.  
 Plateau brook—30,000 S1.  
 Rough brook-River Inhabitants—250 Sf.  
 Skye brook—30,000 S1.

*Victoria County—*

Aspy River, north—40,000 A1.  
 Aspy River, middle—40,000 A1.  
 Baddeck River—50,000 Ad, 50,000 A1.  
 Farquar Angus or McDonald brook—20,000 S1.  
 Gillis brook—30,000 S1.  
 Harris brook—10,000 S1.  
 Peter brook—40,000 S1.  
 Barasois River—50,000 S1.  
 Ingonish River—30,000 A1.  
 Middle River—50,000 Ad, 50,000 A1.  
 Black brook—25,000 S1.  
 Cold brook—30,000 S1, 520 Sf.  
 Indian brook—40,000 S1.  
 McDonald brook—30,000 S1.  
 North River—170,000 A1, 30,000 A2.  
 Washabuck River—40,000 S1.

## DEPARTMENT OF FISHERIES

## MERSEY PONDS

*Lunenburg County—*

Crouse Lake—1,000 S5.  
 Feener Lake—1,500 S5.  
 Halfway brook—1,000 S5.  
 Petite Riviere—1,500 S5.

*Queens County—*

Five Rivers, headwaters—3,100 S5.  
 Louis Lake—1,500 S5.  
 McAlpine brook—2,000 S5.

Mersey River and tributaries—107,530 A3,  
 1,300 S5.  
 Beaverdam brook—4,500 S5.  
 Eagle Lake brook—5,000 S5.  
 George brook—5,000 S5.  
 Kempton brook—5,000 S5.  
 Ten-mile Lake—4,500 S5.  
 Upper Great brook—4,000 S5.  
 Mitchell brook—1,500 S5.  
 Path Lake—1,000 S5.  
 Robertson Lake—1,000 S5.

## MIDDLETON HATCHERY

*Annapolis County—*

Annapolis River—35,000 A3.  
 Bear River, east branch—10,000 S2.  
 Cranberry Lake—8,000 S3.  
 Elliott Lake—3,250 S3, 650 S4.  
 Fed Lake—8,000 S3.  
 Fishers Lake—20,000 S2.  
 Grand Lake, upper—10,000 S3.  
 Jeny Lake—6,000 S4.  
 Katy or Cady Lake—7,000 S3.  
 Lake Pleasant—15,000 S2.  
 Lequille River—40,000 A1.  
 Little River-Annapolis River—10,000 S2.  
 Long Lake-Medway River—1,550 S4.  
 McGill Lake—20,000 S2, 4,000 S4.  
 Morton brook—5,000 S3.  
 Nictaux River—150,000 A2, 50,000 A3,  
 50,000 S3.  
 Paradise Lake—12,000 S2.  
 Parker brook—15,000 S2.  
 Phinney's Pond-Annapolis River—2,000 S4.  
 Ramsey (Rumsey) Lake—3,880 R3.  
 Round Hill River—30,000 A2.  
 Sandy (Sand) Lake—10,000 S2.  
 Sandy Bottom Lake—10,000 S2.  
 Shannon River—35,000 A3.  
 Slocomb brook—5,000 S2.  
 Stronach Lake—10,000 S3.  
 Thirty Lake—10,000 S2.  
 Trout Lake—10,000 S3, 4,000 S4.  
 Walker brook—12,000 S2, 2,000 S4.  
 Waterloo Lake—25,000 S1.  
 Wiswal (Wiswell) brook—6,000 S3, 2,000  
 S4.  
 Zwicker Lake—10,000 S2.

*Digby County—*

Haines Lake—8,000 S3.  
 Harris Lake—10,000 S3.  
 Lake Jolly—15,000 S2.  
 Mallette Lake—7,000 S3.  
 Mistake River—8,000 S3.  
 Porter or Mistake Lake—15,000 S3.  
 Stony brook-Sissiboo River—2,000 S3.

*Hants County—*

Avon River, west branch—50,000 A1.  
 Chain Lake-Avon River—8,000 S4.  
 Falls Lake stillwater—10,000 S3.  
 Murphy Lake-Avon River—7,000 S3.  
 Palmer Lake—10,000 S3.  
 Panuke Lake—12,000 S2, 12,000 S3.  
 Stark Lake—10,000 S3.  
 Zwicker or Daniel Lake—8,000 S3.

*Kings County—*

Annapolis River—30,000 A2.  
 Cornwallis River—30,000 A2.  
 Gaspereau River—35,000 A2.  
 Sunken Lake—1,440 R3.

*Lunenburg County—*

Bezanson Lake—8,000 S4.  
 Blystner Lake—8,000 S4.  
 Canoe Lake, north—12,000 S3.  
 Card Lake—25,000 S1.  
 Cook Lake—9,000 S3.  
 Crouse Lake—3,000 S3.  
 Gold River—100,000 A1.  
 Harris Lake—10,000 S2.  
 Indian Lake-Gold River—7,000 S2.  
 Lahave River—100,000 A1, 35,000 A3.  
 Lake William—15,000 S2.  
 Lewis Lake—7,000 S2.  
 New Germany Lake—12,000 S2, 12,000 S3.  
 Newcombe Lake—5,000 S2.  
 Oakland Lake—12,000 S3.  
 Park Pond-Lahave River—1,500 S3.  
 Petite River—50,000 A1.  
 Sherbrooke Lake—69,000 G3.  
 Spectacle Lake, near Lunenburg—3,500 S3.  
 Spondo Lake—8,000 S3.  
 Wallaback Lake—15,000 S2.  
 Wentzell Lake—3,500 S3.  
 Whetstone Lake—10,000 S2.  
 Whitman's Pond-Lahave River—1,500 S3.  
 Wiles Lake—5,000 S2.

*Queens County—*

Maligeak or Malaga Lake—12,000 S2,  
 30,000 S3.

## NICTAUX FALLS REARING STATION

Nictaux River—25,000 Ac.



## YARMOUTH HATCHERY

*Digby County—*

Belliveau River—10,000 Sd.  
 Carleton River—  
   At French Mill—15,000 S2.  
   Big Hill brook—12,000 S1.  
   Boarback Lake—50,000 Sd.  
   Briar Lake, upper—10,000 S2.  
   Brooks, near Havelock—36,000 S1.  
   Porcupine brook—12,000 S1.  
   Seven Pence Ha' penny River (Wentworth brook)—48,000 S1.  
   Wentworth Lake—15,000 S2.  
   Whitewater brook—37,480 Sd.  
 Church Point brook—10,000 Sd.  
 Comeau brook—10,000 Sd.  
 Duffy brook—10,000 Sd.  
 Felix brook—10,000 Sd.  
 Grosses Coques River—10,000 Sd.  
 Journeay brook—8,000 S1.  
 Mavillette brook—10,000 Sd.  
 Meteghan River—  
   Brooks, near Corberrie—52,000 S1.  
   Budd brook—8,000 S1.  
   Joe - a - re Lake—486 Sf.  
   Rocky brook—8,000 S1.  
 Salmon River—25,000 A4.  
 Bony Lake—10,000 S1.  
 Goudey Lake—53 Sg.  
 Tusket River, east branch (Silver River)—38,000 S1.  
   Barrios brook—12,000 S1.  
   Braddies Meadow brook—10,000 S1.  
   Chocolate brook—10,000 S1.  
   Harris brook—10,000 S1.  
   Kempt back Lake brook—10,000 S1.  
   Randalls mill brook—10,000 S1.  
   Travis brook—12,000 S1.  
   Whistler Lake—12,000 S1.  
   Whistler Lake brook—24,000 S1.

*Queens County—*

Tait Lake—662 Sf.

*Shelburne County—*

Jordan River—55,000 Ad.

*Yarmouth County—*

Allen Lake—10,000 S1.  
 Argyle River—20,000 S1.  
 Carleton River—  
   Bullerwell brook—24,000 Sd.  
   Harding brook—8,000 Sd.  
   Hanf brook—8,000 Sd.  
   Hicks brook—8,000 Sd.  
   Nickerson brook—8,000 Sd.  
   Richardson Lake—10,000 S1.  
   Ryerson brook—8,000 Sd.  
   Sloan Lake—10,000 S1, 35 Sg, 17 Sh.  
   Sweeney brook—8,000 Sd.  
 Chegoggin River—20,000 S1.  
 Darling Lake—10,000 S1.  
 Salmon River—  
   Bull Hill brook—8,000 Sd.  
   Crosby brook—8,000 Sd.  
   Gardner brook—10,000 S1.  
   Hamilton Mill stream—10,000 S1.  
   Hawley Road brook—10,000 Sd.  
   Pleasant Valley brook—8,000 Sd.  
   Saunders Mill stream—10,000 S1.  
 Stillwater brook (Pubnico Harbour)—10,000 S1.  
 Tedford Lake—50,000 Sd.  
 Trefry Lake—50,000 Sd.  
 Tusket River, east branch (Silver River)—  
   Crowell brook—8,000 Sd.  
   Gang Mill stream—2,000 S1.  
   Halfway brook—8,000 Sd.  
   Little Meadow brook—8,000 Sd.  
   Reuben brook—8,000 Sd.  
   Salter Lake brook—8,000 Sd.  
   Tinkham brook—8,000 Sd.  
 Tusket River—100,000 A4, 30,000 S2.  
   Burrell brook—8,000 Sd.  
   Coldstream brook—50,000 Sd.  
   Ring brook—8,000 Sd.  
 Welches brook (Pubnico Harbour)—10,000 S1.

## NEW BRUNSWICK

## CHARLO HATCHERY

Antinori Lake—10,000 Sc.  
 Benjamin River—94,000 A1.  
 Black Lake-Walker brook—260 Sf.  
 Black brook-Christopher brook—100 Sf.  
 Charlo River, north branch, below dam—94,000 A1.  
 Charlo River, north branch, above dam—293 Sk.  
 Charlo River, south branch—243 Sk.  
 Christopher brook—309 Sf.  
 Jacquet River—95,000 A1, 42,000 A2.  
 Juniper Lake—600 Sf.  
 Loch Lomond—260 Sf.  
 Nipisiguit River—283,000 A1, 52,240 A2.  
 Popelogan Lake—1,600 S3.  
 Restigouche River—439,500 A1, 109,000 A2, 116,000 A3.  
 Kedgwick River—54,000 A2, 18,000 A3.  
 Matapedia River—176,000 A1, 73,500 A2.  
 Upsalquitch River—176,000 A1, 55,500 A2.  
 Robinson Lake—500 Sf.

## FLORENCEVILLE HATCHERY

*Carleton County—*

Acker brook-Saint John River—30,000 Sd, 400 Sf.  
 Ash brook-Fewer Lake—25,000 Sd, 400 Sf.

Becaguimec River—50,000 Ad, 120,000 A1, 45,000 A2.

Bennett Lake—400 Sg.

*Carleton County—Con.*

Birmingham brook-Becaguimec River—30,000 Sd.  
 Bubby brook-Saint John River—15,000 Sd.  
 Bulls creek-Saint John River—25,000 S1, 1,600 Sf.  
 Bull creek-Eel River—15,000 S1, 400 Sf.  
 Burke brook-Shiktahawk River—10,000 Sd.  
 Burnt Land brook-Becaguimec River—40,000 Sd, 20,000 S1, 2,000 Sf.  
 Burpee brook-Presquile River—25,000 S1, 600 Sf.  
 Buttermilk creek-Saint John River—9,000 Sd.  
 Cold stream-Becaguimec River—60,000 Sd, 25,000 S1, 2,200 Sf.  
 Colton brook-Shiktahawk River—10,000 Sd.  
 Cross creek-Becaguimec River—20,000 Sd.  
 Day brook-Becaguimec River—20,000 Sd.  
 Debec brook-Sherwood Lake—50,000 S1, 2,000 S4, 700 Sf.  
 Dingle brook-Presquile River—20,000 S1.  
 Gallivan brook-Little Presquile River—15,000 Sd.  
 Gibson Mill brook-Saint John River—1,500 Sf.  
 Gin brook-Becaguimec River—20,000 Sd.  
 Guisguait River—25,000 S1, 500 Sf, 600 Sg.  
 Hagerman brook-Meduxnekeag River—20,000 Sd, 400 Sf.  
 Hardwood brook-Saint John River—10,000 Sd.  
 Harmon brook-Saint John River—15,000 Sd.  
 Harold brook-Presquile River—15,000 Sd.  
 Hatfield brook-Saint John River—20,000 S1.  
 Hayden brook-Becaguimec River—25,000 Sd.  
 Johnville Beaver pond-Shiktahawk River—400 Sg.  
 Lanes creek-Saint John River—15,000 Sd.  
 Little Guisguait River—20,000 S1, 600 Sf.  
 Little Presquile River—50,000 S1, 2,500 Sf.  
 Lily brook-Saint John River—25,000 Sd.  
 Maynes Brook-Little Presquile River—30,000 Sd.  
 McLeary brook-Lakeville pond—30,000 Sd, 400 Sf.  
 Meduxnekeag River—50,000 Ad, 60,000 A1, 50,000 A2.  
 Mile brook-Presquile River—15,000 Sd.

Miramichi River, southwest and tributaries—50,000 Ad, 185,000 A1, 40,500 Af.  
 Monquart River—50,000 Ad, 80,000 A1, 65,000 A2.  
 Payson Lake—400 Sg.  
 Presquile River—50,000 Ad, 90,000 A1, 60,000 A2.  
 River des Chutes—50,000 Sd, 600 Sf, 85 Sh, 280 Sk.  
 Saint John River—290,000 S1.  
 Shiktahawk River—50,000 Ad, 40,000 A1, 70,000 A2.  
 Smith brook-Becaguimec River—10,000 Sd.  
 Sucker brook-Lakeville pond—40,000 Sd.  
 Tweedie brook-Saint John River—6,000 Sd.

*York County—*

Artificial Lake-Keswick River—500 S3.  
 Brown Lake—600 Sf, 800 Sg.  
 Cedar brook-Dead creek—7,000 S2.  
 Charlie Lake-Shogomoc River—2,000 S3.  
 Cranberry or Harvey Lake—25,000 S1, 1,800 Sf.  
 Cross creek-Nashwaak River—2,000 S4.  
 Davidson Lake—1,400 Sf.  
 Dead creek-Eel River—20,000 S1, 600 Sf.  
 George Lake—50,000 S1, 2,000 S4, 3,000 Sf.  
 Green Hill Lake-Keswick River—600 Sg.  
 Indian Lake—400 Sg.  
 Joslin or Waterloo Lake—600 Sf.  
 Keswick River—50,000 Ad, 40,000 A1, 20,000 A2.  
 Kingsley brook-Nashwaakis River—1,500 S4.  
 Longs creek-Saint John River—25,000 S1.  
 Mactaquac River—50,000 Ad, 20,000 A2.  
 Nackawic River—50,000 Ad, 75,000 A1, 20,000 A2.  
 Nashwaak River—80,000 A1.  
 Nashwaakis River—30,000 S1, 1,000 Sf, 400 Sg.  
 Penniac brook-Nashwaak River—600 Sf.  
 Pokiak River—25,000 S1, 2,000 S3, 800 Sf.  
 Rusagonis River—1,000 S5.  
 Rustine (Risteen) brook-Eel River—10,000 S1.  
 Shogomoc River—40,000 S1, 800 Sf.  
 Skiff Lake—15,000 A2, 48 Lk.  
 Solomon Lake—6,970 S2.  
 Taffa Lake—25,000 S1.  
 Tinkettle brook-Nashwaak River—30,000 S1.

## GRAND FALLS HATCHERY

*Victoria County—*

Saint John River and tributaries—980,000 A1, 180,000 A2, 600 A3.  
 Bout brook—10,000 S1.  
 Hatchery brook, above falls—1,330 S4.  
 Little River—15,000 Sc, 94,480 S1, 20,000 S2, 45,000 S3.  
 Ryan brook—45,000 S1.  
 Salmon River and tributaries—300,000 A1, 134,000 A3.  
 Foley brook—15,000 S1, 15,000 S3.

Mooney brook—10,000 S1, 11,890 S3.  
 Sutherland brook—75,000 S1, 20,000 S3.  
 Tobique River and tributaries—25,000 A1, 180,000 A3.  
 Pokiak brook—75,000 S1, 20,000 S2.  
 Trout brook—15,000 S1.

*Madawaska County—*

Baker brook—25,000 S3.  
 Baker Lake—90,000 S3.  
 Caron Lake—160,000 S3.

*Madawaska County—Con.*

Grand River—75,000 S3.  
 Green River—185,000 S3.  
 Iroquois River—45,000 S3.  
 Nine Mile brook—5,000 S4.  
 Six Mile brook—5,000 S4.

Trout brook—45,000 S3.

Unique Lake—100,000 S3.

*Restigouche County—*

Five Fingers brook—50,000 S3.

## MIRAMICHI HATCHERY

Bartibog River—19,000 S1, 7,000 S2.  
 Black River—13,300 S1, 9,800 S3.  
 Burnt Church River—10,200 S1.  
 Grand Aldouane River—10,800 S1.  
 Miramichi River, northwest and tributaries  
 —1,185,600 Ad. 142,400 A1, 550 A2.  
 Parks brook—450 S3.  
 Miramichi River, southwest and tributaries  
 —670,400 Ad. 288,000 A1, 19,000 A2.  
 Burnt Land brook—8,800 S1.

Long brook—8,800 S1.  
 Miramichi River, little southwest—651,000  
 Ad. 160,800 A1.  
 Napan River—5,700 S1.  
 Pokemouche River—9,000 S2.  
 Pollett River—164,700 A2.  
 Tabusintac River—52,800 Ad.  
 Eskedellic River—19,000 S1, 7,000 S2.  
 Little Tracadie River—9,000 S2.

## SAINT JOHN HATCHERY

*Albert County—*

Crooked creek—6,841 R2.  
 Fair Lake—600 S4.  
 Grassy Lake—600 S4.  
 Lake View Lake—600 S4.  
 Standard Lake—5,000 Sd.  
 Turtle creek—10,000 S3, 900 Sf, 240 Sg.

*Charlotte County—*

Berry brook-Waweig River—7,500 S1.  
 Campbells brook-Digdeguash River—7,500  
 S1.  
 Chamcook Lake—21,000 L2, 3,054 Lf, 3,521  
 Lg.  
 Cox brook-Magaguadavic River—7,500 S1.  
 Crevy Lake—812 Sf.  
 Digdeguash River—102,500 S1, 17,500 S3,  
 1,400 Sf, 670 Sg.  
 Disappointment or Mistake Lake—20,000  
 Sc.  
 Falls brook-Digdeguash River—5,000 S1.  
 Gibson Lake—7,718 S2.  
 Green Brown brook-Canoose River—7,500  
 S1.  
 Halls brook-St. Croix River—2,500 S1.  
 McCarlies brook-Waweig River—5,000 S1.  
 McDougall Lake—20,000 S1, 35,000 S2.  
 McGuires brook-Waweig River—18,000 S3.  
 Meadow brook-Oak Bay—2,500 S1.  
 Mohannas creek—10,000 S1.  
 Murchie brook-Denny stream—2,500 S1.  
 New River—85,000 Sd, 10,000 S2, 3,800 S4,  
 500 Sk.  
 Piskahegan River—15,000 S2.  
 Red Rock Lake—25,000 S2.  
 Sandy brook-Canoose River—5,000 S1.  
 Spear's brook-Trout Lake—20,000 S1,  
 30,000 S2.  
 Stein Lake—7,500 S1.  
 Utopia Lake—80,000 S1.  
 Waweig River—5,000 S1, 6,000 S3.  
 Welch Lake—1,200 S5.

*Kent County—*

Bass River—3,200 S2.  
 Buctouche River—36,000 Sd, 5,000 S2.

Coal Branch River—12,000 Sd, 11,000 S2.  
 Cocagne River—24,000 Sd, 3,000 S2, 3,000  
 S3, 500 Sf, 200 Sg.  
 Kouchibouguac River—3,200 S2.  
 Mahalawodiack River or McKee Mills  
 stream—36,000 Sd, 5,000 S2.  
 Murray brook-Cocagne River—5,000 S2.  
 Richibucto River—3,200 S2, 6,000 S3.  
 St. Nicholas River—12,000 Sd.  
 Salmon River—3,200 S2.  
 Trout brook-Richibucto River—3,200 S2.

*Kings County—*

Anderson brook-Big Salmon River—3,600  
 S2.  
 Bacon or Island Lake—12,700 Sc.  
 Bens or Bulls Lake—12,000 S2.  
 Chisholm Lake—1,000 S2.  
 Chocolate brook-Big Salmon River—6,000  
 Sd.  
 Crawford Lake—4,600 S4.  
 Hammond River—823 R5, 24,000 Sd,  
 50,000 S1, 5,000 S2.  
 Kennebecasis watershed—115,000 Ad,  
 155,000 A1, 100,000 A2.  
 Headwaters—12,000 S3, 2,000 S4, 710 Sf,  
 315 Sg.  
 South branch—13,500 S3, 1,000 S4.  
 Chestnut brook—12,000 Sd, 1,000 S3, 500  
 S4.  
 Chittick brook—500 S3.  
 Colwell brook—1,200 S5.  
 De Corsey Lake—500 S3.  
 Dee brook—12,000 Sd.  
 Ellison brook—1,000 S3.  
 Hairey brook—6,000 Sd.  
 King brook—6,000 Sd.  
 McAfee brook—6,000 Sd.  
 McGregor brook—4,800 S2, 1,000 S3.  
 McLeod brook—12,000 Sd, 7,200 S2,  
 2,500 S3.  
 Midland brook—1,200 S5.  
 Millbrook—2,000 S3.  
 Oldfield brook—1,000 S3.  
 Parlee brook—6,000 S2, 1,000 S3.  
 Piccadilly brook—12,000 Sd, 2,400 S2.

*Kings County—Con.*

Renebec brook—6,000 Sd.  
 Smith creek—4,800 S2, 1,200 S4, 830 Sf,  
 235 Sg.  
 Snyder brook—2,500 S3.  
 Stone brook—1,500 S3, 1,000 S4.  
 Studholm brook or Millstream—7,200  
 S2, 2,000 S3, 1,700 S4.  
 Walton Lake—800 S4, 180 Sg.  
 Ward creek—12,000 Sd, 6,000 S2, 2,000  
 S3, 2,500 S4.  
 Mechanic Lake—Pollett River—5,000 S3,  
 300 Sf.  
 Murphy Lake—2,200 S4.  
 Ox Shoe Lake—1,000 S1.  
 Tait Lake—6,000 Sd.  
 Terreo Lake—1,600 S4.  
 Whittaker Lake—3,000 S1.

*Queens County—*

Boker Lake—1,400 S4, 1,700 S5.  
 Forks stream—Canaan River—2,000 S2,  
 4,500 S3.  
 Lary O'Lary Lake—15,000 S1.  
 Morgan Lake—3,000 S3, 1,960 S4.  
 Nerepis River—  
 North branch—3,000 S2.  
 West branch—1,600 S2.  
 Ball Mountain brook—800 S4.  
 Clarendon brook—4,400 S2.  
 Globe Lake—784 S4, 60 Sg.  
 Irvine brook—2,000 S5.  
 Little Lake—800 S4.  
 Little Lake brook—800 S4.  
 Long Lake—800 S4.  
 Mud Lake—15,000 S2.  
 No. 10 brook—3,000 S2.  
 O'Donnell Lake—1,600 S2.  
 O'Neil Lake—4,000 S1.  
 Square Lake—2,000 S2, 800 S4.  
 Welsford brook—2,400 S2.  
 Oromocto River—  
 Meadow brook—1,800 S4.  
 Peet brook—8,000 S2.  
 Sand brook—1,800 S4.  
 Spring brook—5,000 S2.  
 Salmon River—98,000 A1, 70,000 A2.

*Saint John County—*

Arnold or Loon Lake—15,000 Sc, 3,000 S1.  
 Back dam—Saint John River—2,000 S2.  
 Balls Lake—1,000 S1, 3,808 S4.  
 Beaver Lake—36,000 Sc.  
 Beaver brook—Mispek River—20,000 S2.  
 Black River—36,000 Sd, 30,000 S2.  
 Blackhall Lake—1,000 S4.  
 Blindman Lake—450 Sg, 200 Sk.  
 Boaz Lake—3,500 S2.  
 Brandy brook—4,000 S2.  
 Cedar Pond—450 S5.  
 Dead brook—Loch Lomond—25,000 Sd.  
 Dolan Lake—20,000 S2, 800 Sk.  
 Douglas Lake—15,000 Sd, 7,000 S3, 2,500  
 S4, 1,000 S5, 350 Sf, 400 Sk.  
 Elderly brook—Little River—14,000 S1.

Germaine brook—18,000 S1, 10,000 S2.  
 Grassy Lake—Black River—10,000 S2.  
 Hanford brook—23,000 S1, 10,000 S2.  
 Hanson River—25,000 S1.  
 Hayns Lake—1,400 S4, 1,400 S5.  
 Henry Lake—35,000 S2.  
 Howe Lake—1,000 A3, 2,500 S3.  
 Island Lake—Saint John River—34,000 Sc.  
 Kelly Lake—Saint John River—25,000 S2,  
 1,600 S5.  
 Lily Lake—Rockwood Park—450 Sf, 450 Sg.  
 Little River—12 Rk, 25,000 Sd, 658 Sf, 370  
 Sg, 109 Sk.  
 Loch Alva (St. John and Kings Cos.)—  
 1,000 S4, 1,000 Sf.  
 Loch Lomond—72,000 Sd, 14,000 S2, 9,500  
 S4, 6,280 S5.  
 Mayflower or Dark Lake—2,200 S4.  
 McCracken Lake—12,000 S2, 1,200 S5.  
 McCormac Lake—1,200 S4.  
 McDonald Lake—1,000 S2.  
 Millican Lake—10,000 S2.  
 Mispek River—5,500 S4.  
 Ping Pond—12,000 Sc.  
 Sadler Lake—1,000 S4.  
 Second Lake—Loch Lomond—48,000 Sd,  
 14,000 S2, 7,500 S4.  
 Taylor Lake—2,500 S5, 450 Sg.  
 Third Lake—Loch Lomond—32,000 Sd, 7,000  
 S2, 7,700 S4.  
 Treadwell Lake—10,000 Sd, 7,000 S3, 2,500  
 S4, 600 Sf, 450 Sg.  
 Tynemouth or Ten Mile creek—90,000 Ad,  
 38,000 A2.  
 Whelley Lake—1,200 S5.  
 Wilmot stream—Loch Lomond—26,000 Sd,  
 30,000 S2.

*Sunbury County—*

Howard brook—Newcastle creek—5,000 S2.  
 Newcastle creek—20,000 S2, 9,000 S3.  
 Oromocto River—156,434 A2, 980 Sf, 320  
 Sg.  
 Back creek—20,000 A2.  
 Douglas Lake—8,500 S2.  
 Morance brook (big)—23,600 S2.  
 Morance brook (little)—2,400 S2.  
 Porcupine brook—3,200 S2.  
 Three Tree creek—14,700 S2.

*Westmorland County—*

Prices brook—Canaan River—1,000 S2,  
 4,000 S3.  
 Tait brook—Memramcook River—2,000 S2.

*York County—*

Big Cranberry or Harvey Lake—12,000 S1,  
 480 Sf, 120 Sg.  
 Dead brook—Magaguadavic River—12,000  
 S1, 1,400 S3.  
 Little McAdam brook—12,000 S1, 1,400  
 S3.  
 Mink Lake stream—Magaguadavic River—  
 12,000 S1, 1,400 S3.  
 Oromocto Lake—12,000 S1.



## PRINCE EDWARD ISLAND

## CARDIGAN PONDS

*Kings County—*

Bear River—4,000 S2.  
 Big brook-Fortune River—4,000 S2.  
 Big pond (Hermanville)—10,000 S2.  
 Brudenell River—9,000 S2.  
 Buell's brook-Murray River—1,990 S3.  
 Cardigan River—4,980 S3.  
 Crane's pond-Morell River—9,000 S2.  
 Creed's pond-Sturgeon River—5,000 S3.  
 Finlayson's pond-Greek River—4,000 S3.  
 Fitzpatrick's pond-Seal River—4,000 S3.  
 Fox River—2,500 S3.  
 Hay River—6,000 S2.  
 Jenkin's pond-Greek River—2,000 S3.  
 Leard's pond-Morell River—9,000 S2.  
 McAulay's stream-Morell River—4,000 S2.  
 McDonald's pond-North Lake—2,000 S2.  
 McEwan's pond-Savage Harbour—2,000 S3.  
 McKinnon stream-Morell River—10,000 S2.  
 McLeod's pond-Midgell River—6,000 S2.  
 Mooney's pond-Morell River—5,000 S2.  
 Morell River—45,000 A2, 93,660 A3.  
 Munn's brook-Brudenell River—3,000 S2.  
 Narrow creek-Boughton River—2,000 S3.  
 North Lake—8,000 S2.  
 Poole's pond-Montague River—2,000 S3.  
 Priest pond (Bayfield)—5,000 S2.  
 Sturgeon River—3,500 S3.  
 Webster's pond-Marie River—4,000 S3.  
 Wigginton's brook-Boughton River—2,000 S3.  
 Whitlock's or Morrison's pond-Boughton River—2,000 S3.

*Prince County—*

Cain's stream—Mill River—5,000 S3.  
 Dunk River—8,500 S2.  
 Enmore River—2,000 S3.  
 Gard's pond-Mill River—2,500 S3.

## KELLY'S POND HATCHERY

*Kings County—*

Big brook-Fortune River—15,000 Sd.  
 Big pond (Hermanville)—15,000 S1.  
 Dingwell's stream-Fortune River—6,000 Sd.  
 East or Hillsborough River—6,000 S1.  
 Finlayson's pond-Greek River—8,000 S1.  
 Goose or Cow River—8,000 S1.  
 Leard's pond-Morell River—10,000 S1.  
 MacLeod's pond-Murray River—10,000 S1.  
 McRae's pond-Montague River—10,000 S1.  
 Midgell River—50,000 A1.  
 Mooney's brook-Morell River—50,000 Ac, 50,000 Ad.  
 Morell River—50,000 Ac, 164,900 A1.  
 Naufrage River—10,000 S1.  
 Ross' pond-Boughton River—10,000 Sd.  
 St. Peter Bay, head of—40,000 Ac.  
 Warren's pond-Head of East or Hillsborough River—5,000 S1.

Green's stream-Miminegash pond—2,500 S3.  
 McArthur's pond-Foxley River—2,500 S3.  
 McWilliams pond-Pierre Jacques River—4,000 S3.  
 Myrick's pond-Little Tignish River—2,500 S3.  
 Old Woollen Mills pond-Tryon River—2,500 S2.  
 St. Nicholas pond-Sunbury Cove—5,000 S2.  
 Sheen's pond-Trout River (Tyne Valley)—3,000 S2.  
 Sheep River—3,000 S2.  
 Tignish River—5,000 S3.  
 Tuplin's pond-Indian River—2,000 S3.  
 Wright Leard's pond-Dunk River—4,000 S2.

*Queens County—*

Ballem's stream-Pownal Bay—2,500 S2.  
 Beer's pond-Clyde River—3,000 S3.  
 Belle River—4,500 S3.  
 Hope River—5,000 S2.  
 Howell's brook-West River—3,000 S3.  
 Lane's brook-Vernon River—2,500 S2.  
 McAulay's stream-Tracadie Bay—2,000 S3.  
 McMillan's pond-Vernon River—2,500 S2.  
 McMillan's pond (Wood Islands)—3,000 S3.  
 McPherson's pond-Flat River—3,000 S3.  
 McPherson's pond-Montague River—4,000 S1.  
 McPherson's pond-Pinette River—3,000 S3.  
 Parson's pond-Glynde River—5,000 S2.  
 Ross' pond-Vernon River—6,000 S2.  
 Simpson's pond-Hope River—4,000 S2.  
 Skye brook-West River—1,500 S3.  
 West River—3,000 S3.  
 Winter River—5,000 S3.

*Prince County—*

Barbara Weit River—5,000 S1.  
 Bell's stream-Prevost Cove—4,000 S1.  
 Brae River—4,000 S1.  
 Carr's stream-Malpeque Bay—4,000 S1.  
 Clark's pond-Wilnot River—15,000 S1.  
 Currie's pond-Lit. Pierre Jacques River—6,000 S1.  
 Dunk River—20,000 S1.  
 Enmore River—3,810 S1.  
 Fitzgerald's pond-Grand River—4,000 S1.  
 Ives' pond-Tryon River—3,270 S1.  
 Leard's pond-Trout River Tributary to Lot 10 River—4,000 S1.  
 Waddell's pond-Traverse Cove—4,000 S1.  
 Wright Leard's pond-Dunk River—8,000 S1.

*Queens County—*

Bagnall's pond-Hunter River—5,000 S1.  
 Black River-Tracadie Bay—5,000 Sd.

*Queens County—Con.*

Clark's stream-East River—10,000 Sd.  
 Coles' pond-North River—6,000 S1.  
 Craswell's pond-Hunter River—6,000 S1.  
 Dixon's stream-De Sable River—15,000 Sd.  
 Gates' pond-North River—4,000 S1.  
 Glenfinnan River—10,000 Sd.  
 Holmes' pond-De Sable River—4,000 Sd.  
 Leard's pond-Crapaud River—10,000 S1.

McAulay's stream-Tracadie Bay—5,000 Sd.  
 Rackham's pond-Wheatley River—10,000 S1.  
 Simpson's pond-Hope River—8,000 S1.  
 Stordy's pond-Crapaud River—4,000 S1.  
 Taylor's pond-Rattenbury River—4,000 S1.  
 West River—20,000 S1.  
 Winter River—15,000 Sd.

## APPENDIX No. 4

## ANNUAL REPORT OF THE ENGINEERING DIVISION

C. BRUCE, M.E.I.C., *Chief Engineer*

The duties of the Engineering Division include responsibility for all technical works of the Department in the Maritime Provinces, British Columbia and the Northwest Territories where administration of the fisheries is entirely or largely under the Federal Government. Generally, these works include the removal, from rivers, of obstructions which impede or prevent the ascent of anadromous fishes to their spawning grounds; the design and supervision of the construction of fishways; fish hatchery establishments; engineering works for the Fisheries Research Board and other incidental works. The division also has charge of the administrative work in connection with oyster and other mollusk fisheries in the Maritime Provinces, including the issue of leases for oyster farming.

## BUILDING FISHWAYS AND CLEARING RIVERS

Works under this head include: (a) surveys and the preparation of designs for adequate fishway facilities for dams which prevent the ascent of fish to suitable spawning grounds and to overcome natural falls or impassable barriers to their ascent, and (b) the removal of artificial obstructions.

Where dams are privately owned, the owners or occupiers are required to instal and maintain adequate fishway facilities therein, in conformity with the requirements of the Fisheries Act, but, as those not conversant with the design of fishways are quite unlikely to provide structures that will prove efficient, it has been the policy of the Department to require that all fishways shall be built in accordance with designs prepared by the Engineering Division. This involves a study of each situation and, after the collection of data and the completion of the necessary ground surveys, the design of a fishway to best meet the conditions peculiar to the situation.

The removal of artificial obstructions includes many varieties of work, depending on the character and extent of the barriers. Particularly in British Columbia, where the country is mountainous, obstructions are liable to accumulate frequently due to extreme freshets, which carry down forest rubbish, and under some conditions may undermine the banks, causing large trees to fall into the water. Many such conditions require immediate action to insure that channels are opened to provide for the ascent of the season's run of fish as otherwise adequate seeding of the spawning grounds would be entirely prevented. Unless obstructions are of a major character, requiring the advice of an engineer, their removal is usually undertaken under the supervision of the local fisheries inspector after the need has been established.

The works undertaken during the year are classified and reviewed hereunder:—

## NOVA SCOTIA

*Tusket River, Yarmouth County.*—As it was the general opinion that salmon, entering the railrace canal of the Nova Scotia Power Commission's hydro-electric development, did not ascend the fishway leading from the canal, both this fishway and that in the diversion dam were fitted with traps to intercept ascending fish. Arrangements were made to capture and tag all salmon entering the tailrace and then release them so that their movements could be followed. In a normal season low water conditions occur in the Tusket River in June but, last year, due to heavy and frequent rains, the river remained sufficiently high so that salmon had no difficulty in ascending to the diversion dam and thence through the fishway in that dam. As a consequence of these conditions the entire early run ascended and none congregated in the tailrace canal as they were reported to have done in previous years. The purpose of the investigation was, accordingly, not fulfilled but information as to the numbers of salmon that ascended the river was obtained, the total being 596 of which 280 were taken by angling. It is planned to continue the investigation during the coming year with a view to securing definite information regarding salmon which collect in the tailrace canal.

*Nictaux River, Annapolis County.*—Some blasting was done to improve conditions for the ascent of salmon at Wambolt Falls on this river. While the falls did not entirely prevent the ascent of salmon, there was a tendency for them to collect below, thus affording an opportunity for poaching and the work was performed to alleviate this condition.

*Round Hill Brook, Annapolis County.*—A screen was placed across a channel leading to a backwater in this stream to prevent salmon from entering it and becoming stranded when the flow decreases.

*Brack's Brook, Cape Breton County.*—An obstruction, consisting of large trees and debris, which had accumulated in the stream and prevented the ascent of salmon and trout, was removed.

*Hipson's Brook, Yarmouth County.*—A small obstruction to the ascent of fish in this brook was removed.

## PRINCE EDWARD ISLAND

*Vernon River, Queens County.*—The fishway in the dam on this river, which is maintained by the Department for the ascent of seatrout, was repaired to make it effective.

## NEW BRUNSWICK

*Chamcook Lake, Charlotte County.*—The Department has maintained a rack at the outlet of this lake for a number of years to prevent the descent of landlocked salmon to the stream below. The old rack was found on examination to be beyond further repairs and it was necessary to renew it. An iron rack with welded joints was installed which, it is anticipated, will serve for several years without repair.

*Miramichi River, Northumberland County.*—Two years ago several small streams tributary to this river were cleared of obstructions, following an investigation by the Fisheries Research Board, which indicated that the spawning grounds for smelts could be greatly extended if more stream areas were made available. It was anticipated that further work would be necessary from time to time to maintain these conditions and some work was done on the streams during the year.



## BRITISH COLUMBIA

*Morrison Creek, Babine Lake.*—A large log and accumulation of debris located about  $1\frac{1}{2}$  miles up from the mouth of the stream, which threatened to completely obstruct the stream, was removed. A heavy run of sockeye salmon ascend this stream.

*Nine Mile Creek, Babine Lake.*—The stream bed was cluttered up by windfalls and debris over practically the whole spawning area a distance of about four miles. These obstructions, while not impeding the progress of fish upstream, hindered them during the low water stage and also caused changes in the course of the stream which had a tendency to widen the bed so that the water flow did not adequately cover it. Removal of these accumulations has greatly improved the stream bed. An average of from four to five thousand sockeye salmon frequent this stream for spawning.

*Yakoun River, Queen Charlotte Islands.*—Three log jams, the largest about four miles and the others five and 12 miles, respectively, from the mouth, which were solidly established entirely across the river and gradually increasing in size, were removed. It was also necessary to remove two large trees across the river about two miles from the mouth to provide a passage downstream for the debris from the jams. The river is frequented by a heavy run of pink salmon in even numbered years.

*Port John Creek, Bella Bella Area.*—An accumulation of drift logs and debris lodged completely across the channel of this stream about one-quarter mile up from the mouth, which was increasing in size, was entirely removed. The stream is frequented by coho and chum salmon.

*Howyat. Two Streams, Bella Bella Area.*—Obstructions composed of logs and debris which had formed near the mouth in each of these streams and which extended from bank to bank and were gradually becoming larger, were making the ascent of coho and chum salmon, extremely difficult during low water stages. The obstructions were completely removed.

*Kwakusdis River, Bella Bella Area.*—An accumulation of down timber and debris across this stream about one-quarter mile from the mouth was removed after conditions had deteriorated considerably following the heavy freshet during the winter months. The stream is frequented by coho and chum salmon as well as a small but consistent run of sockeye salmon.

*Bully Bay Creek, Bella Bella Area.*—An obstruction located about four or five hundred yards from the mouth of this stream, and consisting of logs, debris and brush, which was proving a very bad obstacle to ascending fish, was removed. The stream is frequented by a light run of pink and a fairly good run of chum salmon.

*Atnarko River, Bella Coola Area.*—Investigation revealed that fairly large log jams and several smaller ones at a point some 58 miles up the river were proving serious obstacles and were also choking the supply of water to the by-pass channel which provided the main passage for ascending salmon. Channels were cut through two large obstructions and several minor blocks were removed. A barrier of logs and drift which threatened to form a serious obstruction about 40 miles from Bella Coola was completely removed. The river is frequented by sockeye, springs, coho, pinks and steelheads.

*Kimsquit River, Bella Coola Area.*—A start was made in cutting a trail up the river to Kimsquit Lake to facilitate spawning ground inspections there. Shortage of labour and unfavourable weather conditions led to the abandonment of the work after little had been accomplished.



*Waukwash River, Owekano Lake.*—A large tree across this river firmly imbedded in the gravel with an accumulation of forest debris adjacent to it, which formed the nucleus of a serious obstruction, was removed. A heavy run of sockeye salmon frequents the stream.

*Genesi River, Owekano Lake.*—This river, which is of major importance as a sockeye spawning area, was obstructed about halfway up with a jam consisting of large trees and an accumulation of forest debris. As it was possible that any major freshet would cause a complete barrier: thus cutting off the upper part of the river, the obstruction was removed.

*Tuna River, Alert Bay Area.*—Three obstructions lying between salt water and Sea Bird Lake, as well as a beaver dam at the outlet of the lake, which formed a complete barrier during the low water stage, were removed. The stream is frequented by Cohoe and Chum salmon.

*Rosewall Creek, Comox Area.*—Considerable work was done at the lower end of this stream by local residents for the purpose of protecting their property against erosion. At one point a jam some 95 feet long, 85 feet wide and 7 feet high with other small accumulations of logs and debris in the channel both above and below it, were entirely removed. Partly as a result of an extremely heavy freshet and partly by work of the local residents, the stream which had cut several undefined diversion channels through the low-lying adjacent land, was confined to its original channel again. In view of the beneficial results that this work will have in providing an unobstructed passage for the ascent of salmon, the Department gave assistance by supplying explosives. The stream is subject to extremely heavy freshets and as there is very little fall at the lower end and the banks are subject to erosion due to flooding, the permanency of any work there is questionable.

*Whiskey Creek, Comox Area.*—A serious obstruction composed of old bridge timbers and debris, which had formed in the canyon in this creek near its junction with Little Qualicum River, was removed.

*Topaz Creek, Quathiaski Area.*—A small jam which was forming a short distance above the mouth of this creek and which was proving an obstacle to ascending chum and coho salmon during stages of low water, was removed.

*Reid Creek, Quathiaski Area.*—An obstruction about a mile above tide water, which was proving detrimental to the passage of salmon, especially during stages of low water was removed.

*Nanoose Creek, Nanaimo Area.*—A considerable quantity of slash and log debris lodged in and across this creek, over a considerable portion of its length, as a result of logging operations. After some preliminary difficulties the logging company admitted responsibility for these conditions and satisfactorily removed all debris.

*Brunnell Creek, Nanaimo Area.*—A jam in this creek about a mile above tide water, consisting of an accumulation of logs and debris, which was found to be blocking the ascent of chums and coho salmon, was completely removed.

*Koksilah River, Cowichan Area.*—Although a fishway overcoming a falls on this river functions satisfactorily during normal and low water stages, salmon were prevented from ascending, by the volume of water, during high stages. In order to overcome this a fishway was built on the opposite side of the river by making an opening through a ledge of rock which allows the water to flow through a natural channel joining two depressions which form resting pools. The rise of 10 feet is overcome in three stages, two of two feet and one of one

foot, the remainder being a channel with an easy gradient. A fairly large accumulation of logs was also removed at the crest of the falls. The stream is frequented by coho and chum salmon and steelheads.

*Cowichan River, Cowichan Area.*—During stages of low water it was found that the entrance to the fishway over Skutz Falls was too high for the easy ascent of salmon. To overcome this a channel, some forty feet in length, leading from the river below into the first compartment of the fishway, was cut through the ledge rock. The channel is fitted with two baffles and a control gate at the head to permit closing it during stages of high water. A deflecting wall at the upstream end of the fishway was extended a length of approximately 25 feet to improve conditions at that point. At a point on the river approximately one and a half miles below Skutz Falls, there is a rapids about 150 feet long with a fall of 11 feet, portions of which during certain stages of the water, form obstacles to ascending salmon. A short channel was cut through the rock around one difficult point and an opening was made in this ledge rock at another point to improve conditions for ascending fish.

*Puntledge River, Comox Area.*—Following the preparation of the design for a fishway in the impounding dam at the foot of Comox Lake, referred to in last year's report, it was decided to proceed with the construction under the supervision of an engineer from headquarters. Hydrometric data procured from the Canadian Colliers (Dunsmuir) Limited, revealed that while the spillway of the dam is at elevation 435.0, freshet conditions made it desirable that the fishway should be operative up to elevation 440.0, while due to the drawn-down of the lake level during the summer, it was necessary to provide for operation down to elevation 426.0. It was, accordingly, necessary to provide for regulating the discharge through the fishway at any point between the high and low elevations above indicated. At the point where the fishway extends through the dam the surface of the ledge rock is at elevation 432.0, and it was, accordingly, necessary to excavate a channel six feet below the foundations of the dam. This channel is 4 feet 6 inches in width extending between the left abutment of the dam and the first pier. The main fishway channel is approximately 130 feet long and varies in width from 10 to 20 feet. Eleven partitions constructed of concrete are provided of which nine are fitted with regulating gates. The entire channel was blasted in ledge rock and, in addition, it was necessary to excavate a channel approximately 60 feet long and 5 feet wide on the up-stream side of the dam to provide water to the fishway when the lake is drawn down.

*Klatse River, Bella Bella Area.*—An obstruction about 400 yards from the mouth of this river, consisting of logs and debris, which was making it difficult for fish to ascend at lower stages of water, was removed. The stream is frequented by coho and chum salmon.

## FISH CULTURAL ESTABLISHMENTS

In addition to work in connection with ordinary maintenance, such as painting, etc., the following works were undertaken:—

### NOVA SCOTIA

*Antigonish Hatchery.*—Extensive repairs were made to the longitudinal rearing ponds, the concrete walls of which had deteriorated and broken down in some cases. It was necessary to renew eight walls entirely.

The wooden floor system in the office and living quarters end of the hatchery building, which had rotted considerably, was entirely removed and replaced with a concrete floor.

The end walls of the hatching room were found to be considerably rotted behind the supply troughs and to prevent a recurrence of this conditions, the lower portions up to a height above the tops of the troughs were renewed with reinforced concrete.

*Cobequid Hatchery.*—Electric lighting was installed in the icehouse and in the housing over the outside rearing troughs.

*Grand Lake Rearing Ponds.*—One of the longitudinal ponds was enlarged by widening and deepening it, to accommodate brood trout. A new bridge was built across the old navigation lock to give access to the circular ponds.

*Kejumkejik Rearing Ponds.*—Twenty-four rearing troughs, a supply trough and water supply pipe line from the dam, were constructed and set up with the requisite trestles and supporting members.

*Lindloff Hatchery.*—A building 21 feet by 39 feet was constructed to provide for a garage for the truck, an icehouse, cold storage room and feed room, with storage for equipment in the attic. The building is frame construction with concrete foundations and floors. The cold storage room is insulated with 6 inches of corkboard and fitted with retorts in the ceiling for ice and salt refrigeration.

A concrete culvert with spillway at the outlet of Lindloff Lake, which provides the water supply for the hatchery, was built replacing the old wooden structure.

*Margaree Hatchery.*—Nine new division dams were built in each of rearing pond series A and S and the wooden cribbing enclosing Pond No. 3, Series B, was replaced by stone and cement mortar side walls and concrete end walls.

Electricity which became available during the year was installed, replacing the 32 volt plant which previously supplied lighting for the establishment. Fourteen new hatching troughs were constructed as replacements.

*Mersey Rearing Ponds.*—An addition to the dwelling provided much needed bedroom and office space.

*Steven's Brook Ponds.*—A concrete dam or barrier was constructed across the rearing ponds to provide an additional subdivision in these ponds.

*Nictaux Falls Sub-Hatchery.*—Considerable repairs were made to the hatchery building, the roof of which had settled, and concrete piers were set to replace the wooden supports under the troughs and tanks in the building.

*Yarmouth Hatchery.*—Concrete floors were placed in three longitudinal ponds and a start was made in the construction of two large circular ponds. Due to scarcity of labour it was not possible to continue this work.

#### NEW BRUNSWICK

*Saint John Hatchery.*—A small spring brook on the hatchery property was cleaned out and four small dams were built across it, to provide three ponds for holding fish.

*Charlo Hatchery.*—Two circular ponds as well as the large brood stock pond were lined with 3 inches of concrete.

#### PRINCE EDWARD ISLAND

*Cardigan Rearing Ponds.*—The water supply dam which is of cribwork construction had developed serious leakage, was repaired by renewing portions of the cribwork and re-sheathing.



## OYSTER CULTURE

The issue of oyster leases in Prince Edward Island and Nova Scotia and in Gloucester County, New Brunswick, where leasing is under Federal Government jurisdiction, was continued during the year under review.

In Prince Edward Island 45 leases were completed, making a total of 1,340 since leasing commenced in 1932. Of this total 616 leases have been cancelled or abandoned by the lessees, leaving 724 having a combined area of 1,515 acres, in effect.

In Nova Scotia one lease was issued, making a total of 286 since leasing commenced in 1938. Cancellations and abandonments have totalled 57, leaving 229 leases, having a combined area of 533 acres, in effect.

As stated in the report for 1944, many enquiries were received following the transfer of jurisdiction of leasing of ground for oyster culture in Gloucester County, N.B., and those interested were invited to apply for ground after the Department's policy had been announced. A total of 161 Provincial leases were in effect at the time of the transfer. These were yearly leases which expired at the end of the calendar year and were renewed as they expired. Instead of again renewing them it was decided to issue Dominion leases to replace them and all lessees were so advised. A total of 159 such leases, comprising 522 acres, were issued.

A total of 475 new applications were received in 1944 and 1945 and of these 101 leases comprising 264 acres were issued during 1945.

With the world war over there is evidence of a revival of interest in oyster development work and, while the cessation of hostilities came too late in the season to have any marked effect on operations during the year, it is anticipated expansion will increase in the coming year.

## SURVEY WORK IN OYSTER CULTURE

Surveying in connection with oyster cultural work includes the establishment of the boundaries of all areas and the preparation of plans and descriptions of such areas for insertion in the leases, as well as other surveys relating to the work. The following surveys were undertaken:

1. Sixty-two areas for new leases were surveyed in Prince Edward Island and 31 re-surveys to establish the boundaries of leased areas, the markers of which had been lost, were made.

2. Survey monuments on the land, from which the boundaries of leased areas in the Malpeque Bay region are established, which had become displaced, were reset and triangulated.

3. Beacons, on ranges marking the grid lines and lease boundaries in Sedgewick Cove and Malpeque Bay, that had been destroyed, were replaced.

4. Marker stakes were set at all survey monuments in the Malpeque Bay and Bedeque Bay areas.

5. Ten surveys of areas for new leases were made in Nova Scotia.

6. Triangulation and stadia surveys were made of Big Harbour and Little Narrows in the Bras d'Or Lakes area and all reference points of lease surveys in Narrows Pond were marked for winter survey.

7. As the number of applications before the Department for new leases in Gloucester County, N.B., was large, special attention was given to the survey of areas for leases. One survey party was fully employed during June and in September two parties were continuously in the field.

In order to have definite reference points for the establishment of the boundaries of leased areas, it was decided to set permanent monuments at convenient points around the shores, and 27 such monuments were placed.



Inaccuracies in the boundaries of areas in old provincial leases, probably due to the markers having become shifted or improperly replaced when the original markers were lost, necessitated considerable checking to prevent conflict with the surveys for new areas.

#### GENERAL

*Gaspé Fisheries Experimental Station.*—The easterly and southerly sides of the property for this station face the sea and previously the Department of Public Works had erected timber protection work along these exposures to prevent erosion of the land by heavy seas. This timber work had been broken down at two points one about 180 feet and the other about 290 feet long. At the request of the Fisheries Research Board a survey of the situation was made and plans and specifications for a heavy concrete seawall to replace the portions of the protection work, requiring attention, were completed. It is proposed to have the work done by contract during the season of 1946.

### APPENDIX No. 5

#### REPORT ON OYSTER CULTURE WORK UNDER THE DEPARTMENT OF FISHERIES FOR THE YEAR 1945-46

*By C. J. Kerswill, Fisheries Research Board of Canada*

The Department of Fisheries and the Fisheries Research Board co-operate in carrying on oyster culture work in the Maritime Provinces. In Prince Edward Island the work has been in progress since 1928, when the Dominion Government obtained jurisdiction over the Province's oyster areas and undertook to develop its oyster industry. A similar transfer of jurisdiction of the oyster areas of Nova Scotia occurred in 1936. Following the transfers, intensive investigations of various factors affecting the reproduction, growth rate, and survival of oysters under a variety of conditions were started, and grounds were soon offered for lease in numerous inlets. In New Brunswick only the Shediac Bay area of Westmorland County and all Gloucester County are yet under federal jurisdiction, the transfer agreements having been completed in 1931 and 1944, respectively. The present status of the industry in each province is outlined below, and for a detailed review of the early developments in various districts, the reader is referred to appendices of previous annual reports of the Department.

Headquarters for the administration of field work in the three provinces are maintained at the Prince Edward Island Biological Station on Bideford River in the Malpeque Bay area. Here the Department has reserved areas for the development and demonstration of oyster culture methods, and for the production of spat for lessees. Although the methods which are developed here have wide application, many other places have special problems requiring local investigation. Other experimental farms are operated, therefore, at Orangedale, N.S., and Malagash, N.S., and recently investigations have been started at Shippigan, N.B., and on the Miramichi River, N.B., near Hardwicke.

Throughout the war keen interest in oyster farming was maintained, but the amount of work done by lessees was greatly reduced, especially in Prince Edward Island, owing to lack of help and materials. Lessees everywhere are stimulated to earnest efforts to develop their areas by the current high market prices for oysters, especially for those of high grade. Many are now fishing large quantities of top-quality oysters from their leaseholds—the results of careful development work over the past five or six years—and their activities are setting an example for others. It is now generally recognized that the productivity of oyster areas can be increased and maintained through oyster

culture and that the quality of the product is uniformly high if proper procedures are followed. There is still a need for continued effort in administration, in further improvement of oyster culture methods, and in education of oyster farmers, especially in northern New Brunswick where oyster farming is yet in the initial stages.

#### A.—PRINCE EDWARD ISLAND

*Malpeque-Cascumpeque Region.*—The principal object of the transfer in 1928 of jurisdiction over oyster areas in Prince Edward Island from the provincial to the federal government was to re-establish the oyster industry in this region. The oysters produced here constituted the greater part of the total Prince Edward Island production from 1880 to 1915 and they were of fine quality, but beginning in 1915 a mortality left the region almost devoid of oysters.

Definite progress has been made towards establishing a profitable oyster industry. As shown in Table I the quantity of oysters marketed and the expenditure on development of leased areas was higher this year than in 1944. No spat collectors were put out in this region by lessees because the spatfall was late, prospects for a heavy set looked poor, and there were sufficient small spat collected in 1944 to stock rearing trays in 1946.

*Regions Affected by More Recent Mortalities.*—A mortality commencing in 1933 destroyed the public fishery in Enmore and Percival rivers. Similar destruction of the oyster fishery in Hillsborough River, some inlets east of Charlottetown and neighboring north shore bays began in 1935. Evidence has been obtained that these mortalities were caused by the same disease as entered the Malpeque-Cascumpeque region in 1915.

Experiments at Enmore River and Johnston River have shown that Malpeque Bay oysters are now resistant to the disease, having been bred from a few survivors, whereas oysters being produced in the regions recently affected are still susceptible. To establish disease-resistant stock in affected areas the Department offers for sale to lessees Malpeque oysters—under marketable size—produced on its reserve in Bideford River. Interest in oyster farming as a means of re-establishing the industry has increased recently, especially in the Alexandra-Pownal and Enmore-Percival districts. This year 130 gallons of separated spat and 47 barrels of small oysters were sold to stock such areas and since 1941 a total quantity of 689 gallons of separated spat and 291 barrels of oysters have been sold.

Summerside Harbour is closed to direct marketing because of pollution but there are large public fishing beds where leaseholders in adjacent approved coves obtain stock in the summer for their areas. In 1945, about 1,000 barrels were re-laid as compared to 3,210 in 1944, 2,300 in 1943, 2,137 in 1942, and 1,335 in 1941. Of these, 883 were re-fished and marketed as compared with 2,753, 1,754, 1,975, and 1,065 in the four previous years. The decreased yield in 1945 was the result of the difficulty experienced in 1944 by lessees in marketing the product, related to the re-laying of oysters for a period of one month. The methods of handling and marketing the re-laid oysters require improvement because the oysters have often been replanted too thickly, causing poor condition before marketing. Experiments are being conducted to determine whether the re-laying period can be reduced and whether other methods of handling the oysters would give improved results. The experiments indicate that it may soon be possible to change the administrative policy in this area and to advise lessees about better methods of handling and marketing.

*Provision of Planting Stock.*—In the Malpeque-Cascumpeque, Bedeque Bay, Enmore-Percival, and other regions, permits are issued to lessees to pick oysters in the shore zone for stocking their areas. The period of picking is limited to

several weeks in the summer when tides are suitable and when the operations can be supervised with least risk of illegal marketing. Many well-shaped oysters are transferred to deeper water thus saving them from winter killing. This year about 550 barrels were picked and replanted.

Limited quantities of planting stock are provided also by the Department, through the fishing of medium-size oysters on some upriver beds in the reserved part of Bideford River. Overcrowding normally occurs here, owing to a heavy natural settlement of spat. The crew of about six labourers employed by the Department throughout the open water season fish the beds when not required for other duties, such as preparing and setting out collectors or fishing marketable oysters in the fall. The oysters are sold at the cost of fishing and preference is given lessees in outlying areas who are just beginning oyster farming operations.

### B.—NOVA SCOTIA

Intensive work in Nova Scotia was not begun until 1936 when the Dominion Government obtained jurisdiction over the oyster areas of the province. Experimental stations where oyster culture methods suited to the special local conditions could be developed, were established in 1936 at Orangedale in the Bras d'Or Lakes area, and in 1937 at Malagash on Northumberland Strait. At the outbreak of war development on leaseholds had just commenced and as yet it has been undertaken on only a small scale. Experiments in spat collection and rearing are providing information which will be useful in the future development of the industry. The development of oyster farming from 1939 to 1945 in the Bras d'Or Lakes and along the Northumberland Strait is summarized in Table II.

#### *Bras d'Or Lakes*

The oysters produced here have weak shells, thin meats, and fresh flavour owing to the low salinity of the water. The value of the product is relatively low and emphasis is being placed on the development of the cheapest possible methods of oyster culture. Natural spat production is good in shallow water areas where lessees are allowed to pick, under permit, small oysters for stocking their leaseholds. Spat collection methods suitable to the region are also well developed.

*Marketing of Shucked Oysters.*—Since low prices are obtained for Bras d'Or Lakes oysters marketed in the shell, in 1939 an attempt was made to market the oysters as shucked meats in bulk, through the co-operation of the Department of Fisheries and the Nova Scotia Marketing Board. As shown in previous annual reports, at first the yield of oyster meats per barrel was low and the venture appeared to be unprofitable, but the results improved in later years.

This year 781 barrels were shucked giving an average yield of 1.5 gallons and the average price received was \$4.25 per gallon. A small portion of the total, 74 barrels, was shucked in the spring when the average price was \$6.03 per gallon; the balance was shucked in the fall when the price averaged \$4.01 per gallon. This drop in price was the result of the importation of large quantities of shucked meats from the United States. In 1944, 1,381 barrels were shucked giving an average yield of 1.5 gallons per barrel and an average price of \$6 per gallon and in the following year 850 barrels were shucked averaging 1.5 gallons per barrel and obtaining an average price of \$6.60 per gallon. Thus in 1945 the price has fallen considerably and it is not expected that prices as high as \$6 per gallon will again be obtained. Since the quality of Bras d'Or Lakes shucked oysters compares favourably with the American product it is expected that the price of the shucked meats from the two sources will be about



the same. Owing to the increased production costs in the United States the price of the American product is much higher than before the war and as long as this condition exists it is possible that the shucking of Bras d'Or Lakes oysters will continue to be profitable.

*Development of Leased Areas.*—Because of marketing difficulties the effort to grow oysters has been relatively slight. As shown in Table II, in 1944 work was done on 173 areas, 96 barrels of seed oysters were planted and the total effort, including 635 days' work by lessees and \$557 cash expenditure, was \$1,668. In 1945 the cash expenditures were increased to \$622, 718 days were spent in connection with 166 areas and 256 barrels of seed oysters were planted, making a total effort of about \$1,878. The quantities of oysters marketed from leased areas in 1944 and 1945 were 765 barrels and 579 barrels, respectively. Thus, the development work increased this year but fewer oysters were fished. The latter was probably the result of the smaller output of shucked meats, which has provided an outlet for oysters produced on both leased areas and public fishing grounds.

### *Northumberland Strait*

In this region the principal areas are Tatamagouche Bay, Caribou Harbour, Pictou Harbour and Merigomish Harbour. Conditions are suitable for the production of higher quality oysters than in the Bras d'Or Lakes and the principal problems concern production rather than marketing. These problems have been largely solved at Malagash, where attention has been given to the use of wide tidal flats which are prevalent in the region. The collection of spat on the flats has been developed successfully and in 1942-43 a convenient plan for holding oysters on collectors over the winter was developed by damming a small tidal creek. A dyke at Malagash is being used to rear spat for one or two years when they are large enough to be placed directly on leaseholds. The results of the investigations at Malagash with further modifications will be useful in developing oyster farming elsewhere.

*Development of Leased Areas.*—The development of private oyster farming along Northumberland Strait from 1939 to 1945 is shown in Table II. The total effort is estimated at about \$3,351, which is considerably lower than in the four previous years but of about the same order as the 1942 figure. The decrease is largely the result of less effort this year in Merigomish Harbour, development work in Tatamagouche Bay, Caribou Harbour and East River having continued at about the same level. During the summer re-laying period oysters were again transferred from dangerously polluted parts of Pictou Harbour to leases in West and Middle Rivers and about 144 barrels were re-laid and 137 fished again.

### C.—NEW BRUNSWICK

The Shediac area was transferred to Dominion jurisdiction in 1931 and in 1944 jurisdiction of oyster leasing in all of Gloucester county was transferred to the Dominion Government. No other transfers have been made.

*Shediac Bay.*—Investigations at Shediac were carried out from 1931 to 1933 and were then postponed until 1940 owing to uncertainty of the public health situation. Spat cannot be collected successfully at Shediac but could be introduced from Malagash, N.S., or from the Bras d'Or Lakes region. Now the chief problem is the lack of a sufficient area to satisfy all the applications for leases and it is probable that changes in the boundaries of the public fishing reserve can be made.



*Gloucester County.*—Shippigan and Caraquet are the centres of the oyster industry in Gloucester County. When all the numerous new applications for leases have been attended to there will likely be about 500 leaseholds in the county. Many of the leases now in effect have been well stocked with small oysters picked by hand along the shores at low tide but natural reproduction is erratic and a dependable source of seed stock is urgently required. For the past three summers an investigator has been stationed at Shippigan and progress has been made towards developing suitable spat collection methods and information has been obtained on the practicability of introducing spat from Nova Scotia.

*Miramichi Area.*—There are a number of provincial oyster leases in effect in the Miramichi River and some assistance has been given the Provincial Government in investigating the possibilities for the stocking of the leaseholds. In 1945 an investigator was stationed on the Miramichi River to obtain data on hydrographic conditions and attempt artificial spat collection. Low spat catches were obtained likely because of the unusually cold and backward season, and the investigations must be continued for several years.

*Desirability of Oyster Farming.*—Oyster farming would likely bring about increased production in New Brunswick and improve the quality of the oysters in many areas. Educational work is necessary and the Department distributes its oyster farming circulars to New Brunswick lessees in both French and English. Recently circulars have been distributed dealing with the need for an increased production of spat for stocking leaseholds, and the need for improvement in the packing and grading of the product. There is a great demand for a continuation of such work.

#### D.—GENERAL

##### *Revenue*

The sources of revenue from the Department's oyster culture work include the sale of oyster spat and medium-size oysters to lessees for stocking purposes, the sale of marketable oysters by tender from the Department's reserved areas, and rentals and royalties on leases. This revenue goes to consolidated revenue and is not credited to the vote but it serves to reduce the actual net cost of the work to the Government considerably below the amount expended under the appropriation. The appropriation in 1945-46, exclusive of cost of living bonus was \$29,800; through economy the expenditure was limited to \$23,152 and the revenue reduced the net cost to about \$17,000.

Table III summarizes the revenue received in 1945-46 and in several preceding years. The details of quantities of oysters marketed and the prices received in previous years may be found in a similar table in preceding reports.

The total revenue for 1945-46 is almost the same as for 1944-45. This shows a considerable increase over the revenue received in 1943-44 when the amount was low owing to a decreased sale of "Standard-Shape" oysters produced on the Department's upriver beds. In recent years oyster farmers generally have experienced difficulty in disposing of the lower grades and fishing of the Department's reserved areas has been almost confined to the downriver Cooper bed where high quality oysters are produced. The upriver beds in the Department's reserve are now being fished during the summer mostly for medium-size oysters which are sold to lessees at cost price for stocking their areas. Although

relatively little revenue is obtained from this source the service is of great benefit to those who are beginning oyster farming operations in new places. In 1945-46 the sales to lessees both of separated spat and medium-size oysters were considerably higher than in the previous year.

### *Results of Investigations and Experiments*

The investigations are described in detail in reports and publications of the Fisheries Research Board and only a brief summary of results is given here.

Prediction of dates of settlement of oyster larvae were made in the usual manner for all areas in the three Maritime Provinces where spat collectors are set out. Oyster spawning was later, owing to the backward season, and worthwhile settlements of spat did not occur before August 1. Excellent spat catches were obtained on the Department's collectors at Orangedale, N.S., and Malagash, N.S., but in the Malpeque Bay area results were good only in Paugh's Creek; only light catches were obtained in Smelt Creek and Trout River. A heavy settlement of spat occurred in Cape Breton on eel-grass at Alba and Gillis Cove; a similar production of eel-grass spat has not occurred since 1939. In the vicinity of Shippigan, N.B., experimental collectors were set out in late July and early August at twelve places; of these, only five places were at all satisfactory and even here the catch was quite light. Spat collection was tried for the first time in the Miramichi River at several places near Hardwicke and only a few spat settled on collectors between August 4 and 14. Good reproduction of oysters in northern New Brunswick can evidently be expected only in occasional years when high water temperatures are reached early in the season.

The identification and description of various bivalve larvae found in plankton tows in the Malpeque Bay area was continued for the fourth summer. The larvae of fifteen species have been newly identified and photographed and the total list now comprises twenty species. All the commonly-occurring species have, therefore, been dealt with and an account of the investigation is being prepared for publication.

Experiments on the rearing of oysters to marketable size on floating trays which have been in progress since 1941 indicate that rapid growth, excellent quality, avoidance of losses and reduction in fishing and other expenses would make the practice profitable. Production of oysters might, therefore, be extended to areas where conditions are good except that firm bottom is lacking.

The effects of sunshine on oyster food and growth (apart from its effect on temperature) offer an explanation for many observed differences in the growth rate and condition of adult oysters and also the development of oyster larvae. Studies begun in 1944 were continued and progress was made in the development of techniques to study various aspects of the problem.

Further investigation of the oyster disease confirms the belief that present Malpeque stock is disease resistant. The recovery which is now evident in the Charlottetown and Enmore-Percival areas, which were more recently affected than Malpeque Bay, has likely been hastened by introduction of the disease-resistant stock.

At Malagash, N.S., the spat taken on 2,400 collectors put out in 1944 wintered well in the small tidal creek which has now been used successfully for three years. The dyke provides a convenient and economical method of rearing spat to a size suitable for planting on leased areas, but there is some risk of winter and spring killing through smothering by silt or damage by ice during the spring break-up.

Malagash spat held on floating trays in Secoudou River, N.B., since 1943 have survived and grown well. This offers a means of overcoming the intermittent success of local spat production in Shediac Bay.

A preliminary study was made of the distribution, growth rates, size at maturity, spawning and other aspects of the life history of the bar clam (*Macra*). Further proof was obtained that the ages of bar clams can be determined accurately from rings on the shells. As soon as the necessary equipment is available it is planned to explore for commercial quantities, using special dredges which can reach grounds not now exploited by hand methods.

### *Grading and Inspection*

New requirements covering the packing and grading of oysters in the shell were introduced by the Department in 1941. Since then, through general meetings and personal contacts, an effort has been made to instruct both the fishery officers and the packers in the proper interpretation of the regulations. In many districts there has been great improvement in shipments of shell stock leaving the coast, and buyers in Montreal and other centres are generally well pleased with the grading regulations and with the oysters being received.

Each fall oysters in cold storage have been checked and reported on by inspectors of the Department in Montreal and one or two other centres. At the same time dealers have been interviewed to determine their views on the quality of the product and to receive any suggestions for improving the packing and grading regulations. This year the major part of the work was done again by Inspector L. J. Murphy, who was at Montreal from November 9 to 23 and at Quebec City from November 26 to 28. To extend the inspection over an earlier period when Inspector Murphy was not available for this work, Supervisor S. J. Homans and Inspector K. J. Sollows examined oysters in Montreal from October 24 to November 3. Altogether 165 packages comprising samples from nearly all districts were opened and examined.

Although many shippers now pack and grade oysters very well there are some who could greatly improve their pack by using well-planed boxes, shaking the containers more vigorously during packing to reduce shrinkage, and eliminating all leaking and undersized oysters. In a few districts where great increases in oyster production have occurred recently, the packers are inexperienced in grading, and more educational work is needed. Too many oysters are shipped as "Not Graded for Shape". Good grading requires the exercising of careful judgment and real interest on the part of the packer in his reputation and future markets.

As the production of oysters increases through intensive oyster farming the closest attention must be given everywhere to the grading and inspection of the product to ensure sound expansion of marketing.



## DEPARTMENT OF FISHERIES

TABLE I.—OYSTER FARMING IN THE MALPEQUE-CASCUMPEQUE REGION, 1935-45

	1935	1940	1942	1943	1944	1945	*Total 1935-45
1. Barrels of oysters planted .....	1,303	5,337	4,580	2,523	3,249	2,060	40,576
2. Concrete-coated spat collectors used (egg- crate fillers) .....	3,350	82,500	28,610	18,480	3,600	.....	427,264
3. Barrels of oysters sold .....	979	3,251	4,538	2,345	2,901	3,719	30,636
4. Receipts from sale of oysters (estimated at \$10.50 per bbl. in 1945, \$9 per bbl. 1941, 1942, 1943, 1944; \$8 previously) .....	\$ 7,832	\$ 26,008	\$ 40,842	\$ 21,105	\$ 26,109	\$ 39,050	\$ 267,357
5. Wages paid by oyster farmers .....	\$ 2,137	\$ 12,485	\$ 8,538	\$ 8,268	\$ 8,450	\$ 10,053	\$ 114,384
6. Money spent for materials used .....	\$ 1,665	\$ 8,914	\$ 10,155	\$ 6,035	\$ 7,263	\$ 7,540	\$ 122,430
7. Total cash expenditure .....	\$ 3,802	\$ 21,399	\$ 18,693	\$ 14,303	\$ 15,713	\$ 17,593	\$ 236,814
8. Days' work be lessees or unpaid assistants .....	1,126	5,085	4,077	2,696	3,419	2,408	43,095
9. Value of (8) at \$1.75 per day .....	\$ 1,971	\$ 8,899	\$ 7,134	\$ 4,718	\$ 5,983	\$ 4,214	\$ 75,417
10. Total Expenditure .....	\$ 5,773	\$ 30,288	\$ 25,827	\$ 19,021	\$ 21,696	\$ 21,807	\$ 312,231
11. Excess of total expenditure over receipts .....	—\$ 2,059	\$ 4,290	—\$15,015	—\$ 2,084	—\$ 4,413	—\$17,243	\$ 44,874
12. Excess of cash expenditure over receipts .....	—\$ 4,030	—\$ 4,609	—\$22,149	—\$ 6,802	—\$10,396	—\$21,457	—\$ 30,543

\* Includes 1936, 1937, 1938, 1939, and 1941 figures which are not shown in detail.

TABLE II.—OYSTER FARMING IN NOVA SCOTIA, FROM 1939 TO 1944

	1939-40		1940-41		1942-43		1943-44		1944-45		1945-46		*Total 1939-45	
	Bras d'Or	North Strait	Bras d'Or	North Strait	Bras d'Or	North Strait	Bras d'Or	North Strait	Bras d'Or	North Strait	Bras d'Or	North Strait	Bras d'Or	North Strait
Number of areas under cultivation .....	70	27	103	28	137	62	161	66	173	72	163	66	163	66
Approximate total area .....	151	95	221	91	244	204	317	209	367	224	324	201	324	201
Barrels of oysters planted .....	130	313	218	226	205	535	96	257	96	1,291	256	191	1,164	3,585
Barrels of oysters sold .....	413	294	393	265	450	596	473	652	765	668	579	356	3,491	3,507
Wages paid for development .....	\$ 44	\$ 60	\$ 18	\$ 110	\$ 24	\$ 1,171	\$ .....\$ 2,281	\$ .....\$ 1,947	\$ .....\$ 1,496	\$ 103	\$ 7,992			
Money spent for materials .....	\$ 479	\$ 193	\$ 276	\$ 123	\$ 655	\$ 2,016	\$ 473	\$ 652	\$ 557	\$ 2,042	\$ 623	\$ 1,253	\$3,545	\$ 7,002
Days' work by lessees .....	388	515	401	379	515	409	498	586	635	633	718	348	3,573	3,877
Value of time by lessees at \$1.75 per day .....	\$ 678	\$ 902	\$ 702	\$ 663	\$ 900	\$ 715	\$ 872	\$ 1,025	\$1,111	\$ 1,107	\$1,257	\$ 609	\$6,251	\$ 6,784
Total value work and materials .....	\$1,201	\$ 1,155	\$1,096	\$ 896	\$1,578	\$ 3,958	\$1,345	\$ 3,902	\$1,608	\$ 5,096	\$1,880	\$ 3,358	\$9,998	\$21,778

\* Includes figures for 1941-42 which are not shown.



## REVENUE FROM DEPARTMENT'S OPERATIONS IN 1945-46 COMPARED WITH THAT OF SOME PREVIOUS YEARS

(Items limited to previous years indented)	1945-46	1944-45	1943-44	1942-43	1941-42	1938-39
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Sale of cardboard collectors bearing spat.....						505 20
Sale of wire containers for spat collectors.....						36 20
Sale of separated spat—821 8/13 gals. @ 65c.....	534 05		97 50		154 60	
Sale of separated spat @ 70c.....		291 30	343 35			
Threshing spat from 160 collectors @ 2c.....	3 20	12 20	3 00			
Threshing spat from 1860 collectors at 1 1/2c each.....					27 90	
Sale of 166 1/2 bbls. small oysters for stocking areas (at \$3.50 per bbl. in 1944, 1945; \$3.00 previously).....	582 75	546 00	415 50	579 00	400 50	579 00
Sale of marketable oysters (average price \$14.10 this year; \$12.57 in 1944-45).....						
Substandard, 48 1/2 bbl. @ \$6.00, 75 bbl. @ \$8.10.....			291 00		607 50	
Standard, 78 bbl. @ \$8.80.....	686 40	1,028 10	617 33	2,915 05	4,471 20	1,510 00
Choice, 45 bbl. @ \$15.25.....	686 25	925 98	336 00	842 30	742 41	1,196 00
Fancy, 21 1/2 bbl. @ \$18.25.....	382 38	611 06	441 35	747 30	822 12	1,293 78
Sale of 13 bbls. oysters from St. Ann bay, N.S.....						57 32
Sale of 18 bbls. oysters from Malagash, N.S. @ \$5.69.....					100 80	
Sale of 3 bbl. 3 pks. oysters from Buc-touche @ \$5.....					16 50	
Sale of 68 gals. of spat from Bras d'Or lakes @ .50.....					34 00	
Logs purchased from Department by H. V. Carr.....					15 00	
Fees for resurveys of boundaries of leases.....				5 00	4 00	21 50
Royalty on oysters taken from leases and rentals on leases.....	3,241 50	2,658 64	2,667 88	2,494 14	2,503 69	1,758 27
	6,116 53	6,073 28	5,212 91	7,582 79	9,900 22	6,957 27

## APPENDIX No. 6

REPORT ON THE WORK OF THE CANNED FISH INSPECTION  
LABORATORY, VANCOUVER, BRITISH COLUMBIA,  
FOR THE YEAR 1945-46By F. CHARNLEY, *Chief Chemist*

During the year 1945-46 the investigations and other work of the Canned Fish Inspection Laboratory, exclusive of the work arising from the routine examinations, have been mainly a continuation of the investigations and other work summarized in last year's report:

(1) An investigation was carried out to determine the mean net weights and the variances in the net weights of one-pound-oval and one-pound-tall canned herring packed in British Columbia during the 1944-45 season. Only the means of the net weights derived from the pooled data were sought in this investigation, but segregation of the data according to canneries and calculation of the variances revealed that there were considerable differences in this character in samples packed at different canneries.

(2) Further work was carried out on the method of determining the acid value of the oil of canned herring by means of the pH of the solution of the oil in benzene and alcohol and previously prepared titration curves. From this work

which was carried out with accurately controlled proportions of benzene, alcohol and water, it has been found that other factors (probably associated with the glass electrode) influence the speed and accuracy with which the acid value of the oil can be determined by this method.

(3) Additional data collected during the past year have revealed the presence of seasonal trends in the refractive indices of the oil of certain species of salmon. The total changes in the means, however, are only slight and do not appreciably affect the value of this method for identification of species, where the pooled data show satisfactory differences in the means, that is, in all cases except in differentiating between pink and coho salmon.

(4) Work on the method of identifying the species of salmon from measurements on the vertebrae has been continued. Data collected during the past year have shown that these measurements when treated by Fisher's discriminant function method give excellent separations between the pairs spring-sockeye, spring-keta, and good separation between the pair pink-coho. The method however, does not differentiate satisfactorily between sockeye and pink, as judged by the data so far available.

(5) Incubation tests on samples of canned salmon and canned herring, representative as far as possible of the various canneries producing these commodities, were continued during the 1945-46 season, but the results were similar to those of preceding years, that is, no non-sterile tins were detected.

(6) The removal of tire-rationing has now made it practicable for the laboratory to undertake work with experimental packs. An investigation using experimentally-packed samples of canned herring has therefore been commenced with the object of developing, if possible, a method of determining the effectiveness of the processing from measurements of the crushing force of the vertebrae. Although some of the experimental samples were by intension greatly under-processed, the incubation test has not so far revealed any evidence of this.

(7) During the past year considerable time has also been spent investigating certain theoretical problems in statistics; for example, the theoretical basis of Fisher's discriminant function method and of other well-known statistical tests. Also some days were spent on consulting work that was carried out by the writer for the Pacific Fisheries Experimental Station.

## APPENDIX No. 7

### REPORT OF THE ATLANTIC FISH INSPECTION LABORATORY, HALIFAX, N.S., FOR THE YEAR 1945-46

By ERNEST HESS, Ph.D.

The work of the laboratory concerned itself primarily with canned fish. A new branch was added to develop and carry on the sanitary control of shellfish plants and products (shucked clams, scallops, oysters, fresh lobster meat).

#### A. CANNED FISH

##### 1. GRADING

In addition to grading of lobster, chicken haddie and mackerel fillets carried out in the previous year, grading of mackerel, herring plain and in tomato sauce, flaked fish, lobster paste, Atlantic salmon and tuna has been added this year.

The following table gives a summary covering a net total of 721 certificates issued for 341,581 $\frac{1}{2}$  cases, as compared with 133,897 $\frac{1}{2}$  cases the previous year.

Kind of canned fish	Number of cases submitted	GRADING RESULTS				
		Extra Fancy	Fancy	Standard	Sub-Standard	Unfit
Lobster.....	16,164 $\frac{1}{2}$	8.5%	59.9%	24.7%	6.8%	0.1%
Lobster paste.....	1,113 $\frac{1}{2}$		77.8%	22.2%		
Chicken haddie.....	162,259		71.4%	20.4%	7.5%	0.7%
Flaked fish.....	11,552 $\frac{1}{2}$		70.7%	29.3%		
Mackerel.....	80,197 $\frac{1}{2}$		58.3%	25.2%	14.5%	2.0%
Mackerel fillets.....	12,564		97.2%		1.8%	1.0%
Herring.....	57,702 $\frac{1}{2}$		70.9%	26.6%	1.9%	0.6%
Tuna.....	28		50%			50%
	341,581 $\frac{1}{2}$	0.4%	68.6%	22.4%	7.7%	0.9%

### RE-GRADING

In the case of 47 lots, comprising 25,283 $\frac{1}{2}$  standard cases, appeals for re-grading were granted by the Minister with the result that the original grade of 16,687 cases (66.0 per cent) was confirmed by the re-grading, 6,875 $\frac{1}{2}$  cases (27.2 per cent) gained a higher grade upon re-grading and 1,721 cases (6.8 per cent) a lower one.

### 2. INSPECTION

#### (a) Quality

At the request of the Canadian Export Board, and the British Ministry of Food, several kinds of canned fish, which did not come under the grading regulations, were inspected. The following table gives a summary of all such goods inspected and the percentages of each found acceptable according to standards established by the laboratory.

Kind of canned fish	No. cases submitted	% accepted	% rejected
Herring in T.S.....	11,377 48's	98.7	1.3
Sardine herring.....	4,245 48's	100.0	0.0
Sardines.....	3,100 100's	100.0	0.0
Kipperd snacks.....	100 96's	100.0	0.0
Gaspereau.....	3,939 48's	96.7	3.3
Chicken haddies in T.S.....	260 48's	0.0	100.0
Flaked fish.....	1,025 48's	74.6	25.4
Shad.....	887 $\frac{1}{2}$ 48's	100.0	0.0
Tomalley.....	80 48's	100.0	0.0
Tuna.....	14 48's	0.0	100.0
Mussels.....	3,475 48's	100.0	0.0
	28,502 $\frac{1}{2}$		

#### (b) Weight

A total of 80 lots of canned fish (lobster 35, mackerel 20, herring 10, mackerel fillets 7, chicken haddie 6, clams 2, mussels, lobster paste, and fish flakes one each) were found to be underweight, as determined from samples submitted for grading or inspection or from routine samples examined by the fisheries inspectors or the laboratory. Of 9 lots which were re-inspected following appeals to the minister, 7 lots were confirmed as underweight, and 2 lots were released as correct.



(c) *Vacuum*

Beginning with the 1945 canning season all canned fish products (except those in flat, drawn cans) were required to have a vacuum of at least four inches (Mercury). A total of 22 lots of canned fish (mackerel 14, lobster paste 4, shad 2, chicken haddie and lobster one each) submitted for grading or inspection were found to have insufficient vacuum to meet the requirements. Some of these lots were reconditioned and found satisfactory while others, mostly overfilled cans which could not be reconditioned, were accepted as sub-standard goods by the Canadian Export Board.

### 3. ROUTINE SAMPLES

Samples of three cans each from the various types of canned fish of all fish and shellfish canneries in the Maritime Provinces were withdrawn once during the canning season or, if these samples were of unsatisfactory quality, additional samples were withdrawn at weekly intervals until the product reached a satisfactory standard of quality. A total of 720 such 3-can samples were inspected, namely: lobster 175, chicken haddie 118, mackerel 101, lobster paste and tomalley 88, herring 75, clams 47, fish flakes 34, mussels 16, mackerel fillets 14, gaspereau 13, kippered snacks 11, shad 11, Atlantic salmon 7, clam juice 5, quahaugs 4, finnan haddie, tuna and tuna paste one each. A report was prepared for each sample and copies mailed to the canner and fishery inspector concerned.

### 4. FIELD WORK

During the canning season, as many as possible of the fish and shellfish canneries were visited at least once. Due to the increased amount of canned fish submitted to the laboratory for grading this year, the amount of time spent in the field was considerably less than during the previous year.

### 5. EXPERIMENTAL CANNING

Experimental canning of shad, shad fillet and smoked shad was undertaken to advise the industry on the possibilities of canning these products commercially. Similarly experimental packs of kippered snacks were prepared.

## B. SANITARY CONTROL OF SHELLFISH INDUSTRY

In collaboration with the Department of National Health and Welfare, the sanitary control of shellfish shucking plants and their products has been added to the functions of the Fish Inspection Laboratory.

During the year the attention was focused on the scallop industry which is centred at Digby, N.S. Bacteriological examinations of sea water in the vicinity of Digby, of shucked shellfish at various stages of handling in the boats and the shore plants have been made, and plant operations and sanitation studied in general. New regulations, under the Fish Inspection Act, for the improved handling of shellfish and sanitary control of plants have been drafted.

## C. OTHER SERVICES TO THE INDUSTRY

### 1. MOISTURE DETERMINATION IN SALT FISH

During the year a total of 36 samples of salt fish were submitted to the laboratory by various salt fish firms and fishery inspectors for moisture determination.



## D. EDUCATIONAL

The Director and members of the staff took part in two short courses for fishermen arranged by St. Dunstons University, Charlottetown, in November, 1945, on Prince Edward Island.

Circulars originally prepared by the writer in The Atlantic Fisheries Experimental Station, Canned Fish Circular series, were again revised and reissued to all canners. A new series of circulars, issued by the Fish Inspection Laboratory, has been started and six new circulars were prepared and issued during the past year, making a total of eight issued so far. The titles of the new circulars are:—

No. 3—Exhausting-Vacuum

No. 4—Canning Shad

No. 5—The Removal of Fish Worms

No. 6—Canning Kipperd Snacks

No. 7—Shellfish Shucking Plants

No. 8—"Home-Made" Cannery Equipment.

## E. RESEARCH

Work is being carried on in connection with the development and application of a chemical method for the estimation of volatile odours in canned fish. Preliminary tests indicate the feasibility of this method as a means of determining quality in chicken haddie. It is planned to continue the work during the winter of 1946-47.

Work on the development of a routine method to measure corrosion in unenamelled herring cans has been completed and a paper on the subject has been prepared and submitted for publication.

Investigations have been carried out on the estimation of spoilage in scallop meats. Preliminary experimental results show pH can be used as an index of freshness and that advanced spoilage of scallop meats can be estimated by means of total volatile base determinations.

Eight short papers covering different aspects of experimental work carried out by the staff of the laboratory were read before the annual meeting of the Canadian Committee on Food Preservation.

## F. LIAISON WITH TRADE AND ADMINISTRATIVE BRANCH OF THE DEPARTMENT

The laboratory has been in almost continuous touch with the office of the Chief Supervisor of Fisheries. When in the field, the director and staff have kept in close contact with the fisheries supervisors and inspectors as well as with the assemblers and can manufacturers. The director attended meetings of the assemblers and canners held at Saint John, Moncton and Charlottetown in May, 1945, and at the invitation of the Quebec Department of Maritime Fisheries visited the Magdalen Islands and held a meeting of the canners at Grindstone. Members of the staff attended the annual convention of the United Maritime Fishermen, held at Amherst in October, 1945, and the fisheries supervisors' conference held in Halifax in January, 1946.

# APPENDIX 8 Statement of Revenue Received During Fiscal Year 1945-46

Ordinary revenue	Total	General Account	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	British Columbia	Yukon	Manitoba	Northwest Territories
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Privileges, Licences and Permits—</i>										
Fishing Licences.....	38,904 75		5,517 50	1,105 25	3,660 50		27,706 00	516 00		399 50
Modus Vivendi.....	314 00		107 00				207 00			
Oyster Leases.....	3,241 50		533 09	2,035 58	672 83					
Trawler Licences.....	9,041 70		9,041 70							
Rentals.....	5 00						5 00			
<i>Proceeds from Sales—</i>										
Pelagic Sealing (Sales of Skins).....	1,013,879 42	1,013,879 42								
Sales of Fish.....	461 72		50 00	60 00	333 00				18 72	
Sales of Oysters.....	3,078 93			3,078 93						
Sundry Sales.....	519 16	72 53	9 62	225 00	14 80	190 00	7 21			
<i>Service and Service Fees—</i>										
Canned Salmon Inspection Fees.....	8,634 15						8,634 15			
Canned Herring Inspection Fees.....	6,913 30						6,913 30			
Miscellaneous Services.....	393 20		390 00	3 20						
Canned Pilchard Inspection Fees.....	193 26						193 26			
<i>Refunds of Previous Years' Expenditure.</i>										
<i>Miscellaneous—</i>										
Premiums on Foreign Currency.....	5 27		4 97	0 15	33 60	180 02	157 76		1 02	49 05
Fines and Forfeitures—					0 15					
Fisheries Act.....	9,094 86		803 00	958 00	1,960 60		5,373 26			
Northern Pac. Halibut Protec. Act.....	4,980 25						4,980 25			
Fish Inspection Act.....	46 93								46 93	
Miscellaneous.....	40 00	40 00								
Total Ordinary Revenue.....	1,100,703 98	1,014,384 45	16,596 94	7,468 68	6,675 48	370 02	54,177 19	516 00	66 67	448 55
<i>SPECIAL RECEIPTS</i>										
Previous Years' War Expenditure.....	11 50						11 50			
Miscellaneous War Revenue.....	8,768 74		8,768 74							
GRAND TOTAL.....	1,109,484 22	1,014,384 45	25,365 68	7,468 68	6,675 48	370 02	54,188 69	516 00	66 67	448 55

Certified Correct,  
F. O. WEEKS,  
Chief Treasury Officer.

Certified Correct,  
D. H. SUTHERLAND,  
Assistant Deputy Minister.

## Financial Statement Department of Fisheries 1945-46

Vote No.	Appropriation	Amount Authorized	Expenditure
ORDINARY EXPENDITURE			
Statutory	Minister's Salary and Car Allowance.....	\$ 12,000 00	\$ 12,000 00
72	Departmental Administration.....	163,760 00	151,883 97
73	(Salaries and Disbursements of Fisheries Officers and Guardians.....	1,480,000 00	607,297 17
	Fisheries Patrol Service.....		361,748 78
	Fisheries Protection Service.....		357,109 32
74 & 462	Building Fishways and Clearing Rivers.....	25,000 00	15,314 60
75 & 463	Educational Extension Service.....	75,000 00	18,271 06
76	Fish Culture.....	199,030 00	192,894 98
77	Oyster Culture.....	34,430 00	25,017 44
78 & 464	Fisheries Research Board of Canada.....	541,700 00	502,009 76
79	International Fisheries Commission (Halibut).....	27,100 00	26,679 50
80	International Pacific Salmon Fisheries Commission.....	42,000 00	41,120 32
81	International Pacific Salmon Fisheries Commission (Hell's Gate).....	750,000 00	370,759 18
82	Grant to the United Maritime Fisheries Association.....	3,000 00	3,000 00
83 & 661	Expenses <i>re</i> Pelagic Seal Skins.....	400,361 34	400,361 34
84 & 465	Harbour Seal Bounty.....	30,000 00	16,385 00
Statutory	Fishing Bounty.....	159,875 25	159,875 25
Statutory	Miscellaneous Civil Service Gratuities.....	290 00	290 00
Total Ordinary Expenditure.....		\$ 3,943,546 59	\$ 3,262,017 67
SPECIAL EXPENDITURE			
85	Extension of Educational Work in co-operative producing and selling among fishermen.....	56,000 00	53,530 24
86	Administrative expenses of Fisheries Prices Support Act 1944.....	60,000 00	
87	Improvement of Shore Facilities for the handling of Fisheries products.....	250,000 00	
466	Construction of a vessel for experimental fishing for Herring and Mackerel.....	100,000 00	58,553 98
Total Special Expenditure.....		\$ 466,000 00	\$ 112,084 32
SPECIAL WAR EXPENDITURE			
Statutory	War Appropriation Act 1945—Construction of Fishermen's Floats, Prince Rupert, B.C.....	61,350 07	35,445 97
	Japanese Fishing Vessels Disposal Committee.....	11 50	11 50
	Subsidy <i>re</i> fishing vessels construction in British Columbia	34,204 00	34,203 27
	Operation of Experimental vessel—East Coast.....	35,000 00	24,031 39
	Subsidy <i>re</i> Fishing Vessels.....	125,000 00	89,067 50
	War Risk Compensation.....	10,000 00	4,200 40
	Expenses <i>re</i> Supply of Frozen Fish—British Ministry of Food	30,000 00	24,824 13
	Subsidy Advances—Canned Salmon (Recov.).....	1,200,000 00	
	War Bonus to crews of Fishing Vessels.....	19,250 00	19,198 17
	Salt Fish Export Regulations (Administration).....	20,000 00	16,020 43
	Administration Canned Fish Regulations.....	11,400 00	7,303 86
	Interest Charges on Purchase of 1945 Canned Salmon Pack for British Government.....	6,000 00	
TOTAL SPECIAL WAR.....		\$ 1,552,215 57	\$ 254,306 62

## (a) United Kingdom Interim Credit—Fisheries

Canned Salmon.....	\$ 11,820,505 59
Canned Herring.....	680,253 18
Frozen Fish.....	848,125 83
Lobster Tomalley.....	3,406 00

(b) Pacific Halibut Treaty Special Account Finance Department.....	8,541 21
Pacific Salmon Treaty Special Account Finance Department.....	15,319 40
Pacific Salmon Treaty (Hell's Gate) Special Account Finance Department.....	123,230 29
Province of British Columbia (Fisheries Research Board) Special Account Finance Department.....	521 09

Financial Statement Department of Fisheries, 1945-46—*Conc.*

(c)	Mutual Aid—Salmon.....	\$ 3,447,777 39
	Mutual Aid—Herring.....	548,389 43
	Mutual Aid—Frozen Fish.....	2,603,289 82
	Mutual Aid—Salted Fish.....	115 63
(d)	Atlantic Herring Investigation.....	31,274 01
	GRAND TOTAL.....	\$ 23,759,157 48

(a) Purchase of Fish by the British Government through Credit arrangements with the Bank of Canada.

(b) Balance due by the United States Government and Province of British Columbia at the close of the fiscal year 1945-46 on account of Divisible Expenses.

(c) Purchase of Salmon, Herring, Frozen Fish and Salted Fish through the Mutual Aid Board for allocation to the United Nations.

(d) Expenditure made on account of the Atlantic Herring Investment was \$39,092.51 of which \$7,818.50 was made through the Fisheries Research Board (Vote 78), the balance of \$31,274.01 being charged to various Provinces and Newfoundland.

Certified Correct,

-F. O. WEEKS,  
Chief Treasury Officer.

Certified Correct,

D. H. SUTHERLAND,  
Assistant Deputy Minister.

## Salaries and Disbursements of Fishery Officers and Guardians

## EXPENDITURE AND SUMMARY 1945-46

NOVA SCOTIA—		
General.....	\$ 1,533 18	
Head Office.....	25,052 91	
District No. 1.....	44,257 09	
District No. 2.....	62,269 39	
District No. 3.....	64,807 20	
		\$ 197,919 77
PRINCE EDWARD ISLAND—		
General.....	341 52	
District No. 1.....	37,481 19	
		37,822 71
NEW BRUNSWICK—		
General.....	1,201 75	
District No. 1.....	28,666 91	
District No. 2.....	62,179 35	
District No. 3.....	37,654 70	
		129,702 71
CANNED FISH INSPECTION OFFICE—EAST COAST.....		23,587 36
FISH CURING INSTRUCTION SERVICE.....		13,181 42
GENERAL ACCOUNT (EAST).....		3,832 61
MANITOBA—		
Prairie Provinces Administration.....		11,451 70
BRITISH COLUMBIA—		
Head Office.....	30,674 53	
District No. 1.....	37,849 14	
District No. 2.....	49,129 72	
District No. 3.....	52,370 95	
		14,567 86
CANNED FISH INSPECTION OFFICE—WEST COAST.....		184,592 20
YUKON TERRITORIES.....		23 00
GENERAL WEST.....		5,183 69
		\$ 607,297 17

## SUMMARY

Nova Scotia.....	\$ 211,453 56
Prince Edward Island.....	51,356 51
New Brunswick.....	143,236 51
Manitoba.....	11,451 70
British Columbia.....	189,775 89
Yukon Territories.....	23 00
	\$ 607,297 17



*Fisheries Patrol Service*  
EXPENDITURE AND SUMMARY 1945-46

NOVA SCOTIA—			
District No. 1			
Chartered Boats.....	\$ 1,033 03		
		\$ 1,033 03	
District No. 2			
Departmental Boats.....	\$ 9,569 78		
Chartered Boats.....	391 68		
		9,961 46	
District No. 3			
Departmental Boats.....	\$ 22,077 78		
Chartered Boats.....	1,080 00		
		23,157 78	
			\$ 34,152 27
PRINCE EDWARD ISLAND—			
Departmental Boats.....	\$ 3,047 75		
Chartered Boats.....	6,888 10		
		9,935 85	
			9,935 85
NEW BRUNSWICK—			
District No. 1			
Departmental Boats.....	\$ 20,964 65		
Chartered Boats.....	267 35		
		21,232 00	
District No. 2			
Chartered Boats.....		13,136 98	
			34,368 98
EAST COAST GENERAL.....		90 79	
			90 79
BRITISH COLUMBIA—			
District No. 1			
Departmental Boats.....	\$ 30,410 11		
		\$ 30,410 11	
District No. 2			
Departmental Boats.....	\$ 102,225 73		
Speed Boats.....	29 48		
Chartered Boats.....	55,401 32		
		157,656 53	
District No. 3			
Departmental Boats.....	\$ 53,992 53		
Chartered Boats.....	30,278 80		
		84,271 33	
Digby Island Warehouse.....	\$ 5,012 56		
New Westminster Warehouse.....	3,646 38		
General.....	245 58		
		8,904 52	
Air Service			
District No. 2.....	\$ 828 73		
District No. 3.....	1,129 67		
		1,958 40	
			283,200 89
			\$ 361,748 78

SUMMARY

Nova Scotia.....	\$ 34,182 54
Prince Edward Island.....	9,966 11
New Brunswick.....	34,399 24
British Columbia.....	283,200 89
	\$ 361,748 78

*Fisheries Protection Service*  
EXPENDITURE SUMMARY 1945-46

East Coast General.....	\$ 254,910 46
West Coast General.....	102,198 86
	\$ 357,109 32

*Educational Extension Service*  
EXPENDITURE 1945-46

Aids in expanding demands for Fish.....	\$ 9,898 25
Fisheries Intelligence Bureau.....	907 55
Advertising.....	6,195 31
Miscellaneous.....	1,269 95
	\$ 18,271 06

## DEPARTMENT OF FISHERIES

## Fisheries Research Board of Canada

## EXPENDITURE 1945-46

	From Vote	From Receipts	Total
	\$ cts.	\$ cts.	\$ cts.
Atlantic Biological Station—St. Andrews, N.B.....	116,443 57		116,443 57
Atlantic Experimental Station—Halifax, N.S.....	71,843 71		71,843 71
Gaspe Experimental Station—Grande River, P.Q.....	34,562 95		34,562 95
Herring Investigation, Atlantic.....	7,818 50		7,818 50
Central Fisheries Research Station.....	12,700 25		12,700 25
North West Territories Investigation.....	35,226 92		35,226 92
Pacific Biological Station, Nanaimo, B.C.....	140,304 40	7,587 67	147,892 07
Pacific Experimental Station, Vancouver, B.C.....	54,475 31		54,475 31
Administration and General—			
Toronto Office (A. G. Huntsman).....	10,421 59		10,421 59
Atlantic Salmon Investigations.....	6,844 00		6,844 00
Travelling Expenses.....	5,766 23		5,766 23
Publications.....	4,677 68		4,677 68
Miscellaneous.....	924 65	3,479 12	4,403 77
	502,009 76	11,066 79	513,076 55

EXPENDITURE MADE IN THE FISCAL YEAR 1945-46 FOR CANNED SALMON  
PURCHASED FOR THE BRITISH MINISTRY OF FOOD

Grade	Size	No. of cans per case	No. of cases	Rate per case	Payments
<i>1943 Pack</i>					
Payment of 5% balance on goods shipped from storage (only 95% paid at storage date)					
				\$	3,189 08
					25 50
				\$	1,686 62
					4,901 20
					92 81
					\$ 4,808 39
<i>1944 Pack (balance)</i>					
A-2.....	1 lb.	48	13	11 50	
A-3.....	$\frac{1}{2}$ lb.	96	93	7 50	
A-3.....	1 lb.	48	211	6 25	
B-1.....	$\frac{1}{2}$ lb.	96	4	14 00	
B-2.....	$\frac{1}{2}$ lb.	96	13	11 25	
B-3.....	$\frac{1}{2}$ lb.	96	2	6 75	
B-3.....	1 lb.	48	12	5 50	
B-3 (minced)...	$\frac{1}{4}$ lb.	96	5		
					353 (x)

(x) Equivalent in full cases—351 $\frac{1}{2}$ Of the 1944 Pack the following quantities were re-sold to  
the Colonies and credits received during the year 1945-46:

A-1.....	$\frac{1}{4}$ lb.	96	1	10 50
A-2.....	1 lb.	48	1,015	11 50
A-3.....	1 lb.	48	127,397 $\frac{1}{2}$	6 25
B-1.....	$\frac{1}{2}$ lb.	96	608	14 00
B-1.....	1 lb.	48	85	12 75
B-2.....	$\frac{1}{2}$ lb.	96	76	11 25
B-3.....	$\frac{1}{2}$ lb.	96	1,529	6 75
B-3.....	1 lb.	48	2,463	5 50

133,174 $\frac{1}{2}$ 

(Equivalent in full cases—133,174)

## Expenditure—

For fish.....	\$	2,573 75
For subsidy on fish @ \$1.75 a case.....		741,205 56
For labels and labelling.....		18 64
For freight.....		8,757 52
For storage and insurance @ 2%.....		4,092 20
For interest @ 5% on payments delayed over 30 days.....		146 29
For miscellaneous charges.....		5,706 68
	\$	762,500 64

EXPENDITURE MADE IN THE FISCAL YEAR 1945-46 FOR CANNED SALMON  
PURCHASED FOR THE BRITISH MINISTRY OF FOOD—*Con.*

Grade	Size	No. of cans per case	No. of cases	Rate per case	Payments
<i>1944 Pack—Concluded</i>					
Credits received for fish re-sold to the Colonies					
For fish.....				\$ 840,893 50	
For labels.....				6,420 82	
For misc. charges.....				1,042 52	\$ 848,356 84
Net Credit.....					Cr. \$85,856 20

<i>1945 Pack—</i>					
A-1.....	$\frac{1}{2}$ lb.	96	193,211	18 90	
A-1.....	$\frac{1}{2}$ lb.	96	136,404 $\frac{1}{2}$	11 20	
A-1.....	$\frac{1}{2}$ lb.	48	6,265 $\frac{3}{4}$	17 65	
A-2.....	$\frac{3}{4}$ lb.	96	149,885	14 15	
A-2.....	$\frac{3}{4}$ lb.	96	16,928	8 82 $\frac{1}{2}$	
A-2.....	$\frac{1}{2}$ lb.	48	11,886 $\frac{1}{2}$	12 90	
A-3.....	$\frac{1}{2}$ lb.	96	298,924 $\frac{1}{2}$	8 90	
A-3.....	$\frac{1}{2}$ lb.	96	14,968	5 70	
A-3.....	$\frac{1}{2}$ lb.	48	561,438	7 65	
B-1.....	$\frac{1}{2}$ lb.	96	5,288	15 15	
B-1.....	$\frac{1}{2}$ lb.	96	146	9 30	
B-2.....	$\frac{1}{2}$ lb.	96	2,727	12 50	
B-3.....	$\frac{1}{2}$ lb.	96	13,201 $\frac{1}{2}$	8 00	
B-3.....	$\frac{1}{2}$ lb.	96	126	5 25	
B-3.....	$\frac{1}{2}$ lb.	48	54,590	6 75	

1,465,989 $\frac{1}{2}$ 

(Equivalent in full cases—1,381,703)

Of this quantity the following amounts have been released to L.F.C. Areas

A-1.....	$\frac{1}{2}$ lb.	96	1	18 90	
A-1.....	$\frac{1}{2}$ lb.	48	21	17 65	
A-2.....	$\frac{3}{4}$ lb.	96	87 $\frac{1}{4}$	14 15	
A-3.....	$\frac{1}{2}$ lb.	96	40	8 90	
A-3.....	$\frac{1}{2}$ lb.	48	28,770	7 65	
B-3.....	$\frac{1}{2}$ lb.	96	10,903	8 00	
B-3.....	$\frac{1}{2}$ lb.	96	126	5 25	
B-3.....	$\frac{1}{2}$ lb.	48	14,403	6 75	

54,331 $\frac{1}{2}$ (Equivalent in full cases—54,268 $\frac{1}{2}$ )

## Expenditure:

For fish .....	\$15,456,814 94
For labels and labelling.....	138,629 08
For freight .....	127,482 85
For storage and insurance @ 2%.....	11,079 47
For miscellaneous costs.....	23,452 82

\$15,757,459 16

Refunds received on fish released  
for L.F.C. Areas:

For fish .....	\$ 406,718 76
For labels .....	1,409 61

408,128 37

\$15,349,330 79

Net Expenditure ..... \$15,268,282 98

## SUMMARY

Total expenditure .....	\$16,524,768 19
Less credits received for fish released to L.F.C. Areas.....	1,256,485 21
	\$15,268,282 98

Funds for the above expenditure were provided  
as follows:

By the Canadian Mutual Aid Board	
From Mutual Aid Appropriation.....	\$ 3,650,776 68
From U.K. Cash receipts Acct. (Cr. bal.).	202,999 29
	\$ 3,447,777 39
By Interim Credit (now transferred to U.K. Settlement Acct.)	11,515,250 34
By Interim Credit (now repaid by British Ministry of Food)	305,255 25
	\$15,268,282 98

(A cheque covering a refund of overpayment of subsidy—\$2,459.73 applicable to 1944 salmon pack was received and forwarded to Canadian Mutual Aid Board for credit to Mutual Aid Appropriation.)

STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR  
1945-46 FOR CANNED HERRING AND SARDINES PURCHASED FOR THE BRITISH  
MINISTRY OF FOOD

## EAST COAST—

Type of Container	Size	No. of cans per case	No. of cases	Rate per case		Payments
<i>1944-45 Pack—</i>						
Ovals (in T.S.)	1 lb.	48	999	6 00 \$	5,994 00	
Payments for freight					398 78	
						\$ 6,392 78
<i>1945-46—</i>						
Sardines	¼ lb.	100	1,650	5 35 \$	8,827 50	
Payments for freight					333 23	
						9,165 73
Total Expenditure—East Coast						\$ 15,558 51

## WEST COAST—

<i>1942-43 Pack—</i>						
Payment for freight				\$	655 01	
						\$ 655 01

<i>1943-44 Pack—</i>						
Ovals	1 lb.	48	1,406	4 80		
Talls	1 lb.	48	240	4 22		
Ovals	¼ lb.	48	113	3 95		
			1,759			
(Equivalent in full cases—1,702½)						
Expenditure: For fish				\$	8,207 95	
For freight					1,449 34	
For tomato sauce					133 54	
For misc. costs					402 23	
						10,193 06

<i>1944-45 Pack—</i>						
Ovals	1 lb.	48	94,004	4 80		
Talls	1 lb.	48	45,751	4 22		
Ovals	¾ lb.	48	72,430	3 95		
Talls (Pilchards)	1 lb.	48	1,695	5 50		
			213,880			

(Equivalent in full cases—177,665)

Of this quantity the following were re-sold to the colonies and refunds were received

		cases	cases
Ovals	1 lb.	17,228	
Talls	1 lb.	81,548	
Ovals	½ lb.	72,430	171,206

Net purchases. 42,674

Expenditure: For fish	\$	938,987 23
For freight		10,333 94
For tomato sauce		1,862 90
For storage and insurance @ 4%		19,810 01
For miscellaneous charges		3,611 98
	\$	974,606 06

Credits received for fish re-sold to the Colonies

For fish	\$	426,173 31
For tomato sauce		9,326 70
		435,500 01

Net Expenditure. 539,106 05

<i>1945-46 Pack—</i>						
Ovals	1 lb.	48	136,791	4 80		
Expenditure: For fish				\$	656,596 80	
For freight					6,533 18	
						663,129 98
						\$ 1,213,084 10
						\$ 1,228,642 61



STATEMENT IN CONNECTION WITH EXPENDITURE MADE IN THE FISCAL YEAR  
1945-46 FOR CANNED HERRING AND SARDINES PURCHASED FOR THE BRITISH  
MINISTRY OF FOOD—*Con.*

## SUMMARY

Total expenditure—West Coast.....	\$ 1,648,584 11	
Total credits —West Coast.....	435,500 01	
	<hr/>	\$ 1,213,084 10
Total expenditure—East Coast.....		15,558 51
		<hr/>
		\$ 1,228,642 61
Funds for the above expenditure were provided as follows:		
By Canadian Mutual Aid Board:		
From Mutual Aid Appropriation...\$	165,497 05	
From U.K. Cash Receipts Acct....	382,892 38	
	<hr/>	\$ 548,389 43
By interim credit (now transferred to U.K. Settlement Acct.).....		157,989 18
By interim credit (now repaid by Br. Ministry of Food).....		522,264 00
		<hr/>
		\$ 1,228,642 61

## FROZEN FISH

EXPENDITURE MADE IN THE FISCAL YEAR 1945-46 FOR FROZEN FISH PURCHASED  
FOR THE BRITISH MINISTRY OF FOOD

Kind of Fish	Quantity	Rate	
	lb.	per lb.	
<b>WEST COAST</b>			
Halibut.....	154,065	22 $\frac{1}{4}$	
	154,118	20 $\frac{1}{2}$	
	137,831	21 $\frac{1}{4}$	
	2,622,187	21 $\frac{3}{4}$	
	52,650	19 $\frac{1}{2}$	
	284,879	20	
	<hr/>		
	3,405,730		
Sole Fillet.....	15,000	31 $\frac{1}{2}$	
	<hr/>		
Total.....	3,420,730		
<i>Expenditure—</i>			
For fish.....		\$ 737,455 87	
For freight, icing charges, etc.....		120,307 10	
		<hr/>	\$ 839,762 97
<b>EAST COAST—</b>			
<i>Nova Scotia—</i>			
Cod Fillets.....	8,266,305	17 $\frac{1}{2}$	
Cod Fillets.....	2,360,145	17	
Cod Fillets.....	140,895	16 $\frac{1}{2}$	
Pollock Fillets.....	11,334,745	12 $\frac{1}{2}$	
Pollock Fillets.....	61,395	12	
Pollock Fillets.....	1,260	11 $\frac{1}{2}$	
	<hr/>		
Total.....	12,164,745		
Out of the above the following quantities were re-sold to France and Holland and refunds received—			
Cod @ 17 $\frac{1}{2}$ c.....	2,612,790		
Cod @ 17c.....	575,280		
Cod @ 16 $\frac{1}{2}$ c.....	87,180		
Pollock @ 12 $\frac{1}{2}$ c.....	319,230		
Pollock @ 12c.....	19,560		
	<hr/>		
Total.....	3,614,040		
		lb.	
Net quantity purchased.....		8,550,705	
<i>Expenditure—</i>			
For fish.....	\$2,045,431 18		
Credit <i>re</i> shipments to France and Holland.....	611,671 48		
	<hr/>		\$ 1,433,759 70
For transportation costs and storage.....	36,120 11		
Credit <i>re</i> shipments to France and Holland.....	8,138 63		
	<hr/>		
		27,981 48	
		<hr/>	\$ 1,461,741 18

FROZEN FISH—*Con.*EXPENDITURE MADE IN THE FISCAL YEAR 1945-46 FOR FROZEN FISH PURCHASED  
FOR THE BRITISH MINISTRY OF FOOD—*Con.*

Kind of Fish	Quantity	Rate per lb.
<b>EAST COAST—<i>Con.</i></b>		
<i>New Brunswick—</i>		
	lb.	
Cod filets.....	873,060	17½
Cod filets.....	49,302	16½
	922,362	
Quantity re-sold to France.....	132,840	17½
Net quantity purchased.....	789,522	
<i>Expenditure—</i>		
For fish.....	\$ 160,920 34	
Credit <i>re</i> shipment to France....	23,247 00	
	\$ 137,673 34	
For freight, storage, etc.....	5,671 25	
Credit <i>re</i> shipment to France....	783 42	4,887 83
Net.....	\$	142,561 17
<i>Quebec—</i>		
	lb.	
Cod filets.....	6,193,170	17½
Quantity re-sold to France and Holland.....	778,140	17½
Net quantity purchased.....	5,415,030	
<i>Expenditure—</i>		
For fish.....	\$1,083,804 76	
Credit <i>re</i> shipment to France and Holland.....	136,171 20	
	\$ 947,633 56	
For freight, storage, etc.....	36,932 71	
Credit <i>re</i> quantities re-sold.....	4,689 48	32,243 23
		979,876 79
<b>EAST GENERAL—</b>		
Storage and Miscellaneous charges.....	\$ 39,507 93	
Credit received <i>re</i> quantities re-sold.....	12,034 39	27,473 54
TOTAL NET EXPENDITURE—EAST COAST.....		\$ 2,611,652 68
TOTAL NET EXPENDITURE—EAST AND WEST COAST.....		\$ 3,451,415 65
<b>SUMMARY</b>		
Total quantities purchased:		
	lb.	lb.
West Coast.....	3,420,730	
East Coast.....	19,280,277	22,701,007
Less shipment to France and Holland.....		4,525,020
		18,175,987
<i>Total Expenditure—</i>		
For Fish—West Coast.....	\$ 737,455 87	
For Fish—East Coast.....	3,290,156 28	
	\$ 4,027,612 15	
For freight, storage, etc.—		
West Coast.....	102,307 10	
East Coast.....	118,232 00	
	220,539 10	
		4,248,151 25
Less credits received <i>re</i> shipments to France and Holland—		
For fish.....	771,089 68	
For freight, etc.....	25,645 92	
	796,735 60	
Net Expenditure.....		\$ 3,451,415 65

FROZEN FISH—*Con.*SUMMARY—*Con.*

## FUNDS FOR ABOVE FURNISHED, AS FOLLOWS:

By Canadian Mutual Aid Board:	
Mutual Aid Appropriation.....	\$ 1,395,071 80
U.K. Cash Receipts Acct.....	1,208,218 02
	<hr/>
Interim Credit (now transferred to U.K. Settlement Account).....	\$ 2,603,289 82
	848,125 83
	<hr/>
	\$ 3,451,415 65

(After Mutual Aid Account was closed further refunds of \$16.66 and \$3.30 were received, applicable as follows: To N.B. Freight Acct. U.K. Cash \$16.66 and D.P.S. Fish Acct. M.A. Appropriation \$3.30. These cheques were sent directly to the Canadian Mutual Aid Board and therefore do not appear in our ledger accounts.)

## SALT FISH

## PAYMENTS MADE IN 1945-46 OF BALANCES DUE ON SALT FISH OF THE 1944-45 PRODUCTION PURCHASED FOR THE BRITISH MINISTRY OF FOOD

Transportation costs—set.....	\$ 78 91	
Packaging charges —set.....	50 82	
	<hr/>	
	\$	129 73
Credit received <i>re</i> shortage in delivery of fish.....		14 10
		<hr/>
	\$	115 63

## Funds furnished by Canadian Mutual Aid Board—

Mutual Aid Appropriation.....	\$ 118 43
U.K. Cash Account Credit Bal.....	2 80
	<hr/>
	\$ 115 63

*Lobster Tomalley*

## EXPENDITURE MADE IN THE FISCAL YEAR 1945-46 FOR LOBSTER TOMALLEY PURCHASED FOR THE BRITISH MINISTRY OF FOOD

## EAST COAST—(Nova Scotia)

No. of cases	Size of can	No. of cans per case	Rate per case
136	$\frac{1}{2}$ lb.	96	22 00
23	$\frac{1}{2}$ lb.	96	18 00
<hr/>			
159			
Total payment made.....		\$	3,406 00

Funds provided by Interim Credit (now transferred to U.K. Settlement Account).

## FISHERIES EXPENDITURE 1945-46 BY PROVINCES

Appropriation	General	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	British Columbia	Northwest Territories	Yukon Territory	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Salaries and Disbursements, Fisheries Officers and Guardians.....		211,453 56	51,356 51	143,236 51			11,451 70	189,775 89		23 00	607,297 17
Fisheries Patrol Service.....		34,182 54	9,966 11	34,399 24				283,200 89			361,748 78
Fisheries Protection Service.....		254,910 46						102,198 86			337,109 32
Building Fishways and Clearing Rivers.....		594 42	64 72	674 72				13,980 74			15,314 60
Educational Extension Service.....						2,218 97	170 35	2,392 00			18,271 05
Fish Culture.....	8,964 75	96 00	16,277 24	64,144 50	4,388 99						192,894 98
Fisheries Research Board of Canada.....	13,556 54	98,916 70	16,392 65	1,762 23							192,894 98
International Fisheries Comm. (Halibut)	104 73	6,757 83	11,995 93	109,659 98	34,562 95		12,700 25	194,779 71	32,096 55	3,130 37	502,009 76
Harbour Seal Bounty.....	28,634 15		1,000 00	1,000 00				26,679 50			25,017 44
United Nations Pacific Salmon Fisheries Comm.		1,000 00	895 00	1,410 00				9,890 00			16,385 00
Fishery Boat Allowance.....		4,190 00						41,120 32			41,120 32
Pacific Salmon Fisheries Comm. (Hell's Gate)		78,407 90	9,747 70	20,810 05	50,909 60						159,875 25
Expenses re Pelagic Seal Skins.....	400,361 34							370,759 18			370,759 18
Extension of Educational Work in co-operative Producing and Selling among Fishermen.....		22,349 79	3,274 74	8,988 55	14,000 00			4,917 26			400,361 34
Construction of a vessel for experimental fishing for Herring and Mackerel.....		19,517 99	19,517 99	19,518 00							53,530 34
<i>War Appropriation Act, 1945—</i>											58,553 98
Rupert, B.C. Japanese Fishing Vessels—Disposal Committee.....								35,445 97			35,445 97
Subsidy re Fishing Vessels Construction in B.C. ....								11 50			11 50
Construction and Operation of Experimental fishing vessel—East coast.....		8,010 46	8,010 46	8,010 47				34,203 27			34,203 27
Subsidy re Fishing Vessels Construction East Coast.....		29,689 17	29,689 16	29,689 17							24,031 30
War Risk Compensation.....		4,200 40									89,067 50
Expenses re frozen fish—British Ministry of Food.....		22,553 44	84 43	2,186 26							4,200 40
War Bonus to Crews of Fishing Vessels.....			200 70	581 71				17,518 87			24,824 13
Salt Fish Export Regulations (Administration).....											19,198 17
Administration Canned Fish Regulations.....	1,230 03	9,423 16	1,548 70	1,548 69	2,269 85						16,020 43
Departmental Administration.....	2,378 25	1,641 87	1,641 87	1,641 87							7,303 86
Minister of Fisheries Salary and Car Allowance.....	151,883 97										151,883 97
Miscellaneous Civil Service Gratuities.....	12,000 00										12,000 00
United Kingdom Intern. Credit—Fisheries Special Accounts Finance Dept.—	290 00			63,823 94	442,023 88						12,290 00
(b) Pacific Halibut Treaty.....		147,396 88	4,793 95					12,693,381 95			13,352,290 60
(b) Pacific Salmon Treaty.....								8,541 21			8,541 21
(b) Pacific Salmon Treaty (Hell's Gate).....								15,319 40			15,319 40
								123,230 29			123,230 29



[illegible]

NOTE.—(a) Purchases of Fish by the British Government through credit arrangements with the Bank of Canada.

(b) Balance due by United States Government on divisible expenses incurred during the Fiscal Year 1945-46.

(c) Balance due by Province of British Columbia on divisible expenses incurred during the Fiscal Year 1945-46.

(d) Purchase of fish through the Mutual Aid Board for allocation to the United Nations and friendly neutral countries.

STATEMENT SHOWING THE ANNUAL EXPENDITURE OF THE DOMINION  
GOVERNMENT ON ACCOUNT OF FISHERIES SERVICE  
SINCE CONFEDERATION

Year	Fish Inspection, etc.	Fish Culture	Fisheries Research Board	Dev. D. S. Fish, etc.	Fishing Bounty	Sundry Services	Total
To June 30, 1867	27,043 97					9,763 40	76,807 37
1867-68.....	32,752 48	800 89				7,550 51	41,103 88
1868-69.....	32,809 60					192 24	33,001 84
1869-70.....	74,163 43	3,074 47				58 00	77,295 90
1870-71.....	77,388 84	4,375 32				80 02	81,844 18
1871-72.....	87,777 45	4,826 24				721 49	93,325 18
1872-73.....	90,517 28	7,360 92				4,400 00	102,278 20
1873-74.....	61,940 98	14,306 13				12,040 13	88,287 24
1874-75.....	48,584 95	17,999 73				3,190 97	69,775 65
1875-76.....	76,128 35	32,055 38				16,193 13	124,376 86
1876-77.....	72,527 25	24,037 73					96,564 98
1877-78.....	73,173 48	20,088 80				95,118 30	188,380 58
1878-79.....	62,430 32	19,888 75				12,389 05	54,708 12
1879-80.....	57,052 94	29,109 61				500 00	86,662 55
1880-81.....	109,579 91	21,530 62					131,110 53
1881-82.....	89,097 62	31,244 29				2,433 33	122,775 24
1882-83.....	92,820 25	25,776 87			172,285 47	28,418 63	319,301 22
1883-84.....	94,166 32	31,289 38			130,344 85	26,301 82	282,102 37
1884-85.....	107,537 35	43,879 82			155,718 98	41,613 50	348,749 65
1885-86.....	118,914 51	38,660 19			161,539 39	71,744 64	390,858 73
1886-87.....	224,133 17	37,821 96			160,903 59	22,902 77	445,761 49
1887-88.....	190,255 40	41,082 04			163,757 92	50,405 09	445,500 45
1888-89.....	161,632 07	38,743 24		103 20	150,185 53	27,577 58	378,241 62
1889-90.....	137,192 33	38,278 96		197 82	158,526 54	32,218 72	366,414 37
1890-91.....	160,269 18	43,023 81		1,548 89	158,241 01	26,521 66	389,604 55
1891-92.....	171,066 94	42,967 19		2,266 74	156,891 85	32,900 20	406,092 92
1892-93.....	191,289 71	47,339 04		1,791 47	159,752 14	83,163 60	483,335 96
1893-94.....	208,068 38	45,024 67		2,624 73	158,794 54	83,961 92	498,474 24
1894-95.....	207,476 76	39,720 76		2,648 63	160,089 42	34,482 88	444,418 45
1895-96.....	211,466 14	38,095 96		3,053 63	163,567 99	13,403 21	429,586 93
1896-97.....	215,063 64	27,330 73		2,925 82	154,389 77	43,876 89	443,586 85
1897-98.....	200,493 77	28,002 32		2,305 73	157,504 00	53,514 83	441,820 65
1898-99.....	203,356 36	34,522 57	4,709 10	2,936 20	159,459 00	12,093 75	417,076 98
1899-1900.....	185,813 31	39,370 12	739 61	13,263 99	160,000 00	45,654 69	444,841 72
1900-01.....	239,441 08	68,961 40	1,990 58	15,160 83	158,802 50	9,984 96	494,341 35
1901-02.....	265,185 22	79,891 85	3,481 00	14,820 41	155,942 00	32,178 33	551,498 81
1902-03.....	266,595 61	77,330 86	3,495 95	13,991 93	159,853 50	9,851 10	531,118 95
1903-04.....	314,335 74	109,287 07	4,496 54	27,385 08	158,943 70	22,867 46	637,315 55
1904-05.....	571,787 63	149,419 24	2,825 50	51,723 32	157,228 24	49,148 98	982,132 91
1905-06.....	409,573 74	209,376 28	5,024 42	87,479 71	158,546 65	107,388 32	977,389 12
1906-07.....	303,620 12	118,681 62	2,596 84	50,312 38	159,015 75	60,995 98	695,222 69
1907-08.....	404,868 55	244,459 96	15,829 30	47,852 71	156,114 50	123,574 80	992,699 82
1908-09.....	464,031 87	190,563 19	21,599 70	40,167 36	159,999 90	126,966 50	1,003,328 52

STATEMENT SHOWING THE ANNUAL EXPENDITURE OF THE DOMINION  
GOVERNMENT ON ACCOUNT OF FISHERIES SERVICE  
SINCE CONFEDERATION

Year	Fish Inspection, etc.	Fish Culture	Fisheries Research Board	Dev. D. S. Fish, etc.	Fishing Bounty	Sundry Services	Total
1909-10.....	689,557 42	180,545 65	14,386 79	55,935 64	155,221 85	101,486 31	1,197,133 66
1910-11.....	456,693 79	220,727 66	9,700 43	62,006 44	159,166 75	320,778 96	1,229,074 03
1911-12.....	531,900 64	235,699 52	16,997 44	57,870 64	159,999 70	120,614 83	1,123,082 77
1912-13.....	661,326 46	283,793 43	21,000 00	66,475 19	159,996 40	66,409 90	1,259,001 38
1913-14.....	1,072,683 45	354,675 13	16,972 47	91,822 18	158,661 25	185,081 52	1,879,896 00
1914-15.....	767,379 35	370,093 17	20,994 69	72,937 23	159,584 14	223,923 88	1,614,912 46
1915-16.....	618,489 44	275,079 38	24,649 33	77,631 98	158,741 05	156,708 67	1,311,299 85
1916-17.....	548,130 30	275,166 53	26,018 15	81,366 60	159,999 80	81,851 38	1,172,532 76
1917-18.....	612,624 42	270,796 95	25,508 72	102,591 73	159,893 10	95,236 18	1,266,651 10
1918-19.....	566,450 40	255,761 60	23,294 62	101,129 01	159,675 25	43,895 64	1,150,206 52
1919-20.....	945,401 82	328,533 33	27,729 74	76,354 09	155,136 70	71,516 79	1,604,672 47
1920-21.....	1,227,664 78	422,761 60	26,973 13	16,893 28	152,519 30	83,036 34	1,929,848 43
1921-22.....	1,074,455 10	390,966 47	43,806 34	19,948 63	159,449 80	177,660 30	1,866,286 64
1922-23.....	839,536 66	353,625 51	44,618 54	13,056 01	157,172 55	178,202 17	1,586,211 44
1923-24.....	838,628 64	369,376 79	46,966 09	20,822 49	159,916 80	175,498 93	1,611,209 74
1924-25.....	794,499 76	357,006 64	46,649 29	30,233 21	159,826 40	152,879 14	1,541,094 44
1925-26.....	791,865 76	342,836 72	105,440 58	5,291 83	159,984 80	160,399 85	1,565,819 54
1926-27.....	820,341 66	257,645 44	123,445 26	6,459 71	159,768 10	179,130 24	1,546,800 41
1927-28.....	913,004 77	353,360 62	137,732 52	42,300 78	158,375 80	289,319 99	1,894,094 48
1928-29.....	955,126 65	434,471 58	192,227 37	96,517 66	151,411 20	262,594 14	2,092,348 60
1929-30.....	1,163,349 00	361,165 09	285,956 53	111,034 51	159,749 35	279,555 56	2,360,810 04
1930-31.....	1,176,613 73	322,586 01	386,383 83	189,678 94	159,773 55	286,647 00	2,521,683 06
1931-32.....	970,669 66	271,159 98	275,665 97	102,025 64	159,432 30	290,115 49	2,069,069 04
1932-33.....	858,612 55	231,035 78	228,062 63	84,766 31	159,780 65	260,716 37	1,822,974 29
1933-34.....	842,672 48	205,934 00	176,239 67	54,191 84	159,311 35	159,520 01	1,597,869 35
1934-35.....	874,067 81	211,021 99	173,745 09	63,068 59	159,976 25	155,634 07	1,642,513 80
1935-36.....	916,763 86	231,036 57	194,872 26	39,128 15	159,966 20	172,246 05	1,714,013 09
1936-37.....	885,973 76	214,528 63	198,435 60	48,030 43	159,977 75	530,368 15	2,037,314 32
1937-38.....	934,243 13	218,055 35	233,614 91	50,065 27	159,857 25	558,990 78	2,154,826 69
1938-39.....	1,107,126 66	233,408 21	242,296 68	54,059 29	159,982 70	773,989 37	2,570,862 91
1939-40.....	891,436 91	224,918 62	240,651 04	56,466 71	159,993 85	1,452,260 92	3,025,728 05
1940-41.....	701,968 67	170,648 97	230,767 74	47,534 05	159,920 40	872,077 57	2,182,917 40
1941-42.....	750,996 22	175,952 43	221,458 93	29,427 68	159,959 60	475,691 95	1,813,486 81
1942-43.....	763,945 71	181,027 36	217,040 76	30,381 14	159,930 60	563,589 29	1,915,914 86
1943-44.....	796,944 38	170,633 67	235,658 57	29,426 29	159,400 80	21,338,879 17	22,730,942 88
1944-45.....	857,390 27	181,006 43	349,156 18	19,401 86	158,232 10	22,386,095 86	23,951,282 70
1945-46.....	1,326,155 27	192,894 98	513,076 55	18,271 06	159,875 25	21,559,951 16	23,770,224 27
<hr/>							
38,938,115 30							12,289,537 77
5,469,992 98							2,509,162 67
10,146,019 42							76,680,897 31
146,033,725 45							

STATEMENT SHOWING THE ANNUAL EXPENDITURE OF THE DOMINION  
GOVERNMENT ON ACCOUNT OF FISHERIES SINCE CONFEDERATION

SUMMARY OF PROVINCES

General.....	7,698,923 40
Nova Scotia.....	27,333,634 28
Prince Edward Island.....	4,087,731 35
New Brunswick.....	12,626,917 85
Quebec.....	8,814,148 14
Ontario.....	4,213,322 19
Manitoba.....	1,856,871 94
Manitoba and Northwest Territories.....	24,771 76
Northwest Territories.....	122,376 00
Saskatchewan.....	580,086 15
Alberta.....	641,689 70
British Columbia.....	78,000,740 89
Yukon.....	32,511 80

TOTAL.....\$ 146,033,725 45

STATEMENT SHOWING THE REVENUE COLLECTED ANNUALLY BY THE DOMINION  
GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE  
SINCE CONFEDERATION

Year	Fish. Rev. and Fines and Forf.	Casual Revenue	Pelagic Sealing Revenue	Sundry Revenues	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
To June 30/67.....	10,490 90				10,490 90
1867-68.....	19,556 97				19,556 97
1868-69.....	13,583 97				13,583 97
1869-70.....	16,622 43				16,622 43
1870-71.....	12,408 97				12,408 97
1871-72.....	10,498 00				10,498 00
1872-73.....	10,338 24				10,338 24
1873-74.....	14,012 83				14,012 83
1874-75.....	14,764 20				14,764 20
1875-76.....	13,571 12				13,571 12
1876-77.....	13,364 85				13,364 85
1877-78.....	14,113 11				14,113 11
1878-79.....	17,738 34	(Halifax Fisheries Award)		(4,490,882 64)	4,508,620 98
1879-80.....	19,423 16				19,423 16
1880-81.....	24,596 94				24,596 94
1881-82.....	23,687 45				23,687 45
1882-83.....	21,337 16				21,337 16
1883-84.....	20,006 50				20,006 50
1884-85.....	26,627 86				26,627 86
1885-86.....	26,088 50				26,088 50
1886-87.....	25,947 53				25,947 53
1887-88.....	42,931 12	414 97		2,067 00	45,413 09
1888-89.....	46,087 96	712 29		10,338 30	57,138 55
1889-90.....	56,956 83	296 05		12,686 50	69,939 38
1890-91.....	60,917 19	273 72		9,877 23	71,068 14
1891-92.....	49,541 39	437 78		13,244 50	63,223 67
1892-93.....	95,892 36	233 67		50,303 29	146,429 32
1893-94.....	73,352 59			6,249 00	79,601 59
1894-95.....	89,150 42			8,162 78	97,313 20
1895-96.....	88,822 66			5,408 34	94,231 00
1896-97.....	98,884 40	2,000 00		7,585 15	108,469 55
1897-98.....	106,179 59			6,923 91	113,103 50
1898-99.....	76,440 10			34,992 36	111,432 46
1899-1900.....	79,788 99			8,607 60	88,396 59
1900-01.....	78,966 61			9,178 50	88,145 11
1901-02.....	67,945 93			13,769 94	81,715 87
1902-03.....	69,710 42			8,925 40	78,635 82
1903-04.....	85,591 03			10,165 50	95,756 53
1904-05.....	80,316 14			11,083 70	91,399 84
1905-06.....	83,441 53			14,568 16	98,009 69
1906-07.....	53,010 25			4,134 00	57,144 25
1907-08.....	80,116 98			93,119 28	173,236 26



## STATEMENT SHOWING THE REVENUE COLLECTED ANNUALLY BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE CONFEDERATION

Year	Fish. Rev. and Fines and Forf.	Casual Revenue	Pelagic Sealing Revenue	Sundry Revenues	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1908-09.....	72,901 56			9,794 70	82,696 26
1909-10.....	74,193 78			10,876 78	85,070 56
1910-11.....	85,785 08			15,076 50	100,861 58
1911-12.....	82,445 01			13,785 00	96,230 01
1912-13.....	92,962 69		200,000 00	13,600 00	306,462 69
1913-14.....	99,266 13			11,728 50	110,994 63
1914-15.....	92,757 02		20,000 00	8,878 75	121,635 77
1915-16.....	98,629 67		10,000 00	5,680 50	114,310 17
1916-17.....	96,376 26		10,000 00	9,912 00	116,288 26
1917-18.....	114,572 39		12,620 36	9,523 60	136,716 35
1918-19.....	123,114 29		962 31	8,592 64	132,669 24
1919-20.....	336,590 99	65,849 64	3,501 60	6,925 33	412,867 56
1920-21.....	297,797 49	7,362 44	185,748 07	37,856 48	528,764 48
1921-22.....	224,156 50	5,451 20	86,080 62	13,212 42	328,900 74
1922-23.....	290,624 32	5,183 15	59,876 83	7,137 60	362,821 90
1923-24.....	173,747 98	3,333 54	35,659 43	8,115 98	220,856 93
1924-25.....	144,505 26	2,903 17	28,752 91	2,137 60	178,298 94
1925-26.....	175,638 99	3,997 34	74,858 96	10,050 68	264,545 97
1926-27.....	185,295 85	3,662 10	35,788 54	633 05	225,379 54
1927-28.....	130,566 95	8,877 09	95,014 07	396 80	234,854 91
1928-29.....	123,473 65	8,128 11	73,236 35	1,316 24	206,154 35
1929-30.....	124,471 29	9,978 85	62,507 32	607 45	197,564 91
1930-31.....	85,140 24	13,730 43	37,163 78	900 64	136,935 09
1931-32.....	47,248 04	12,322 90	44,471 94	1,894 06	105,936 94
1932-33.....	8,392 32	14,132 17	2,609 16	3,212 43	28,346 08
1933-34.....	52,134 18	26,039 22	52,466 26	1,941 98	132,581 64
1934-35.....	51,046 62	6,837 22	89,549 74	1,774 82	149,208 40
1935-36.....	48,859 07	4,681 69	113,594 61	727 23	167,862 60
1936-37.....	62,334 46	9,174 27	103,494 19	1,727 10	176,730 02
1937-38.....	68,065 25	6,075 50	45,262 51	420 60	119,823 86
1938-39.....	63,883 34	8,884 92	39,355 17	654 93	112,778 36
1939-40.....	65,433 10	8,413 09	74,025 84	715 33	148,587 36
1940-41.....	62,301 54	8,235 59	160,810 77	97,712 52	329,060 42
1941-42.....	80,299 57	9,897 20	325,131 12	40,403 57	455,731 46
1942-43.....	82,906 87	7,717 42	212,131 35	17,276 70	320,032 34
1943-44.....	80,333 20	5,091 68	219,260 71	735 07	305,420 66
1944-45.....	73,265 92	5,955 35	374,743 20	25,701 15	479,665 62
1945-46.....	81,489 17	13,339 91	1,013,879 42	775 72	1,109,484 22
	6,185,829 56	289,623 67	3,902,557 14	5,234,585 53	15,612,595 90

## REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE CONFEDERATION

## SUMMARY BY PROVINCES

General.....	8,741,416 43
Nova Scotia.....	884,420 78
Prince Edward Island.....	215,021 69
New Brunswick.....	755,988 79
Quebec.....	359,466 31
Ontario.....	561,139 94
Manitoba.....	335,540 75
Manitoba and Northwest Territories.....	7,416 45
Northwest Territories.....	9,981 78
Hudson Bay District.....	1,192 88
Saskatchewan.....	95,152 41
Alberta.....	234,710 87
British Columbia.....	3,391,372 07
Yukon.....	19,774 75

\$ 15,612,595 90



### **ERRATUM**

British Columbia Statements Nos. 1 to 13, inclusive, which should appear as part of Appendix No. 1, will be found on pages 105 to 112 inclusive.





DOMINION OF CANADA

SEVENTEENTH  
ANNUAL REPORT

OF THE  
DEPARTMENT OF FISHERIES

EIGHTIETH ANNUAL FISHERIES REPORT  
OF THE DOMINION

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FOR THE YEAR

1946-47



OTTAWA  
EDMOND CLOUTIER, C.M.G., B.A., L.Ph.,  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
CONTROLLER OF STATIONERY  
1948



*To His Excellency Field Marshal the Right Honourable Viscount Alexander of  
Tunis, K.G., G.C.B., G.C.M.G., C.S.I., D.S.O., M.C., LL.D., A.D.C.,  
Governor General and Commander-in-Chief of the Dominion of Canada*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour herewith, for the information of Your Excellency and the Parliament of Canada, to present the Seventeenth Annual Report of the Department of Fisheries, being the Eightieth Annual Fisheries Report for the Dominion.

I have the honour to be,

Your Excellency's most obedient servant,

MILTON F. GREGG,  
*Minister of Fisheries.*

DEPARTMENT OF FISHERIES,  
Ottawa, October 1, 1947.





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## REPORT OF THE DEPUTY MINISTER

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To the Hon. MILTON F. GREGG, M.P.,  
Minister of Fisheries.

SIR,—Herewith I have the honour to transmit the Seventeenth Annual Report of the Department of Fisheries, which covers the fiscal year 1946-47 and is the Eightieth Annual Report on the fisheries of Canada.

Appendices which are included are the following:—

Reports of the Chief Supervisors of Fisheries for the Eastern and Western Divisions, respectively.

Report of the Chief Inspector, Central Division.

Report of the Director of Fish Culture.

Report of the Fisheries Engineer.

Report on Oyster Culture and the Further Development of Oyster Farming.

Report on the Work of the Atlantic and Pacific Fish Inspection Laboratories.

Financial Report of the Department.

### DEPARTMENTAL EXPANSION

The fiscal year 1946-47, marked the beginning of new recruitment into the Department of Fisheries, both at headquarters and in the field, and saw, as well, through replacement or renovation, improvement in service equipment, such as patrol boats.

The wartime development of the fishery, which has since been sustained, created urgent needs with respect to additional personnel. Increasing such personnel difficulties were the deaths or retirements of a number of staff members. With the termination of the war and the availability to some extent of men with suitable capabilities the Department was able, during the twelve months under review, to fill certain appointments.

The first step in the direction of increasing the Department's staff was taken on both the East and West coasts where a total of 135 men, all war veterans, were selected by the Department in co-operation with the Department of Veterans' Affairs and the Vocational Training Branch of the Department of Labour, for a course which would qualify them as full-time fisheries inspectors. Upon completion of their studies and following examination by the Civil Service Commission, 131 are to be assigned to field work, thus adjusting the serious need of a widening of the Department's inspection services.

Coincident with field expansion has been the need of increased staff at the Department's headquarters at Ottawa. There, a number of key appointments are to be filled and it is hoped that progress will be made in this connection during the fiscal year 1947-48. The reorganization at headquarters and in the field is intended to equip the Department for the more effective discharge of the duties placed upon it by Parliament.

### FISHERIES RESULTS IN 1946

World requirements of protein foods continued throughout 1946 to be far in excess of the available supply. The year was, therefore, one of continued strong markets for the products of the Canadian fishery. Not only was the

demand strong in the domestic market, but also in the regular commercial export markets and in the special markets arising out of the relief purchases made through UNRRA. Prices, although for the most part under controls of one form or another, continued at the relatively high levels established during the war. Production was also maintained at a high level. More men and vessels were available to the fishing industry. While subject to the usual variations in weather conditions and other factors affecting the catch of each individual species, the over-all catch was high. Preliminary figures of landings indicate a total catch by sea fishermen of some 1,230 million pounds. In addition, inland fishermen provided close to 100 million pounds. The sea fisheries returned some \$56.5 million to the fishermen. Income to inland fishermen would add a further \$10 million to the national total.

Figures are not yet available on the marketed value of the 1946 catch, but preliminary estimates would place the figure somewhat above the record value of \$113.7 million reached in 1945.

Under an arrangement between the Department of Fisheries, provincial fisheries services, and the Dominion Bureau of Statistics, the annual statistics of the fishing industry are compiled and published by the Bureau. The collection, revision, compilation and publication of these data take considerable time, as a very large number of individual reports have to be handled each year. It will be some little time, therefore, before the final figures for 1946 are available. Full details of the operations of the industry will be available in the annual printed statistical report, Fisheries Statistics of Canada, 1946.

On the basis of preliminary data, some generalized statements can be made regarding the position of the industry in 1946. On the Atlantic coast, cod and lobster represented the two major sources of income to fishermen. Landings of cod in 1946 were close to 310 million pounds, or slightly above the landings of 1945. Landings of lobster were close to 40 million pounds, as compared to just over 37 million pounds in 1945. Prices of these two species were well maintained throughout 1946.

Since the outbreak of war in 1939, there has been a marked upward trend in the filleting and freezing of cod, while the amounts used for salting have tended to decrease. There has also been a considerable expansion in the production of canned cod to meet the special relief demands. In the case of lobster, the trend has been towards the marketing of a greater proportion of the catch in the live state rather than in cans.

The Atlantic groundfish or demersal fishery provided a further 86.5 million pounds of haddock, pollock, hake, etc.; and the pelagic fishery 278.0 million pounds of herring and mackerel (including 100 million pounds of sardine-herring). An interesting development in 1946 was the commencement of tuna canning in significant commercial quantities.

On the Pacific coast, 1946 was the peak year of the sockeye run in the Fraser River, with the result that the canned pack of this valuable species reached a figure of more than 0.5 million (48-pound) cases. Chum salmon also provided a substantial pack, but the run of pinks was most disappointing. The total British Columbia canned salmon pack was over 1.3 million cases. The British Ministry of Food was the major purchaser of canned salmon. After minimum requirements had been made available to the domestic market there was little available for export to countries other than Britain.

The continued demand for large quantities of canned herring by UNRRA, together with substantial markets in the Philippines, South Africa, Australia, and other countries, resulted in an all-time record pack of over 1.6 million



cases. This wartime development has proved an important factor in maintaining the high value of British Columbia's fisheries. The halibut and most other important Pacific fisheries also enjoyed a good season in 1946. The pilchard and tuna fisheries, however, were considered a failure.

The inland fisheries maintained the high level of production induced by the firm markets and high prices enjoyed since early in the war.

Altogether, Canada exported 517·2 million pounds of fish food products in 1946, valued at about \$85·7 million—increases of 9·1 per cent and 7·3 per cent respectively, over the 1945 figures. The most important factors in this expansion were the products of the herring fishery, exports of fresh (sardine) herring to the United States showing an increase of 49·9 per cent, and exports of canned herring (as military supplies mainly in 1945 and as relief supplies in 1946) an increase of 41·6 per cent. These are low-priced products and consequently had a greater effect on the total volume than on the total value of the export trade.

Other items showing significant increases were dried cod: 13·7 per cent, chiefly in the Caribbean markets, and smoked cod fillets 70·8 per cent in the United States market. On the other hand, decreases were registered in canned salmon exports to other markets than the United Kingdom: 82·7 per cent (this however, represented in large part a diversion of supplies from overseas bases to the United Kingdom home market); in groundfish (cod and haddock) fillets to the United States: 15·3 per cent; and in certain other items.

### PAYMENTS OF FISHING BOUNTY

All told, 19,430 boat and vessel fishermen and the owners of 10,019 fishing boats and vessels shared in the fishing bounty payments totalling \$159,992.85 which were paid on the Atlantic coast during the year. These bounty payments are made under authority of an Act to Encourage the Developing of Deep-sea Fishing and the Building of Fishing Vessels. The basis of payments varies slightly from year to year but for 1946 it was as follows: To eligible boat fishermen, \$6.80 each; to vessel fishermen, \$7.35 each; for boats measuring not less than 12 feet in keel, \$1 each; for vessels, \$1 for each registered ton, with payment in any one case limited to a maximum of \$80. The total amount of bounty was shared by 956 fishing vessels and their crews, \$45,498.15, and 9,063 boats and boat fishermen \$114,494.70.

Details of the distribution are as follows:—

## DEPARTMENT OF FISHERIES

1940-47

Province and County	Boats	Men	Amount \$ cts.	Vessels	Tons	Average Tons	Men	Amount \$ cts.	Total Amount \$ cts.
<b>NOVA SCOTIA—</b>									
Annapolis.....	198	293	2,190 40						2,190 40
Antigonish.....	116	166	1,244 80						1,244 80
Cape Breton.....	240	408	3,057 95						6,410 40
Cumberland.....	4	6	44 80	87	1,096	13	307	3,352 45	44 80
Digby.....	278	497	3,655 10	40	480	12	97	1,193 45	4,848 55
Guysboro.....	509	774	5,772 70	46	644	14	135	1,636 25	7,408 95
Halifax.....	644	906	6,790 90	21	471	22	125	1,389 75	8,180 65
Inverness.....	303	600	4,938 50	28	343	12	137	1,349 95	6,288 45
Kings.....	67	86	651 80						651 80
Lunenburg.....	622	774	5,887 20	55	2,685	48	827	8,764 95	14,652 15
Pictou.....	20	38	278 40						278 40
Queens.....	157	242	1,802 60	21	310	15	66	795 60	2,598 20
Richmond.....	329	622	4,550 10	22	280	13	56	691 60	5,250 70
Shelburne.....	587	927	6,892 10	163	2,048	13	503	5,748 05	12,640 15
Victoria.....	249	327	2,472 60	20	247	12	55	651 25	3,123 85
Yarmouth.....	151	311	2,265 80	81	2,100	26	249	3,930 15	6,195 95
<b>Totals.....</b>	<b>4,474</b>	<b>7,037</b>	<b>52,504 75</b>	<b>584</b>	<b>10,704</b>	<b>18</b>	<b>2,557</b>	<b>29,503 45</b>	<b>82,008 20</b>
<b>NEW BRUNSWICK—</b>									
Charlotte.....	146	270	1,987 00	33	443	13	103	1,202 05	3,189 05
Gloucester.....	453	886	6,480 30	114	2,188	19	475	5,682 25	12,162 55
Kent.....	174	297	2,194 10	19	236	13	44	559 40	2,753 50
Northumberland.....	34	86	618 00	29	335	12	86	967 10	1,585 10
Restigouche.....				1	14	14	3	36 05	36 05
Saint John.....	14	24	177 20					177 20	177 20
Westmorland.....	79	144	1,058 20					1,058 20	1,058 20
<b>Totals.....</b>	<b>900</b>	<b>1,707</b>	<b>12,514 80</b>	<b>196</b>	<b>3,216</b>	<b>16</b>	<b>711</b>	<b>8,446 85</b>	<b>20,961 65</b>
<b>PRINCE EDWARD ISLAND—</b>									
Kings.....	285	408	3,059 90	1	16	16	3	38 05	3,097 95
Prince.....	423	743	5,489 40	1	40	40	6	84 10	5,573 50
Queens.....	165	305	2,239 00						2,239 00
<b>Totals.....</b>	<b>873</b>	<b>1,456</b>	<b>10,788 30</b>	<b>2</b>	<b>56</b>	<b>23</b>	<b>9</b>	<b>122 15</b>	<b>10,910 45</b>

		\$		cts.		\$		cts.		\$		cts.	
Quebec—													
Bonaventure.....	260	537	3,911 60	33	438	13	137	1,444 95	5,356 55				
Gaspe.....	1,365	2,434	17,929 05	141	1,975	14	545	5,980 75	23,909 80				
Magdalen Islands.....	208	559	4,009 20						4,009 20				
Matane.....	61	95	715 00						715 00				
Saguenay.....	922	1,646	12,122 00						12,122 00				
Totals.....	2,816	5,271	38,686 85	174	2,413	14	682	7,425 70	46,112 55				
GRAND TOTAL.....	9,063	15,471	114,494 70	956	16,389	17-75	3,959	45,498 15	159,992 85				

NOTE: A number of late claims amounting in all to \$1,885.40 which are included in this statement are for the season of 1945.

As the basis of distribution for 1945 differed from that of 1946 a number of figures in the "Amount" column do not, as a result, balance with the number of claims paid.

## CANADIAN RETURNS FROM PRIBILOF SEALING

Net revenue to Canada on Pribilof fur seal account in 1946-47 amounted to \$447,000, or, to be exact, \$446,835.93, which meant that it was \$165,000 or so below the return for the preceding fiscal year. Ups and downs in sealing revenue from year to year are explained, for the most part, by changes in the price levels for finished skins and by fluctuations in the number of skins put on the market. So far as the Pribilof herd itself is concerned, it has increased steadily in numbers ever since it was first brought under international control in 1911. At that time the herd had been almost wiped out by unrestricted sealing and numbered only 125,000 or 150,000 animals, but by 1946 it had so grown that United States authorities, who have jurisdiction over the Pribilofs, estimated that the seal population was about 3,386,000.

The 1911 control and conservation scheme was brought into effect by a treaty between the United States, Russia, Japan, and Canada or, strictly speaking, the United Kingdom since in those days the Dominion did not exercise treaty-making powers. This Pelagic Sealing Treaty, which related to some Asiatic seal rookeries and their herds as well as to those on the Pacific side of North America, ceased to be operative in 1941, following a year's notice by Japan of intention to abrogate. Since then a provisional agreement between Canada and the United States has governed fur seal hunting on the Pacific coast of the continent.

Canada's revenue from this sealing business in 1946-47 consisted, in part, of the proceeds, less costs, from the sale of 13,919 dressed skins which the Department, handling fur seal matters for the Government, had put on the market at Montreal fur auctions. The other part of the revenue represented the Canadian share of the proceeds from 28,032 skins marketed by the United States Government. Under the present agreement between the two countries all of the sealing at the Pribilofs or adjacent Bering Sea rookeries is carried on under the control of the United States federal authorities but Canada is entitled to one-fifth of the annual "take" of skins. (Under the old four-power treaty the Canadian share was slightly smaller.) Sometimes Canada has chosen to receive all of its share in raw skins and make its own arrangements for having them finished and marketed; at other times the share has been taken in part in skins and in part in payments from the United States; or in some combination of these several arrangements.

The skins marketed by the Department at four Montreal fur sales during the past year brought an average price of \$48.76. The highest prices were obtained at the June auction when one lot of pelts, incidentally, sold at an all-time record level—\$120 each. At that time, however, high prices were prevailing for furs of all kinds. Of the total number of sealskins offered by the Department at the Montreal auctions nearly 10,500 had been finished by a leading firm in London, England, which had processed substantial numbers of skins for Canada in the past, and over 3,400 had been finished by a firm at St. Louis, U.S.A., which is prominent in the North American fur trade. Most of the skins had been dyed in brown (London brown, Safari, and Matara) but several thousand were finished in black.

None of the pelts entering into the dollar account for the year came from the 1946 sealing season—skins taken in one season are not ready for market in the dressed and dyed form until some time later—but the Dominion did receive, of course, its share of the year's take, or 12,905 skins out of a total of 64,523. In this instance Canada elected to take delivery in raw salted skins. Subse-



quently, 25 per cent were sent to London for processing and the remainder to St. Louis. Including these two lots, a total of 21,867 Canadian-owned sealskins were in the hands of the processors at the end of the fiscal year, 12,192 in London, 9,675 in St. Louis.

### INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

Under the terms of the convention ratified by Canada and the United States on July 28, 1937, the International Pacific Salmon Fisheries Commission studied the life history of the sockeye salmon and related problems for eight years before beginning the regulation of the fishery. During this time it was found that railroad construction had altered conditions at Hell's Gate 133 miles from the mouth of the Fraser, so as to form an almost complete obstruction to salmon migration between certain water levels. Fishways have been completed which allow the sockeye to pass around the area without delay. The Commission must now rebuild the early "up-river" runs that have been so seriously damaged by obstructions, through careful regulation of the fishery and by aids to natural propagation.

The Commission met six times during 1946. The first two meetings were held in Vancouver, B.C., March 8 to 10 and April 17 to 20, to work out the various aspects of the 1946 regulations. Later, during September and October, the Commission held four short meetings at Bellingham, Washington, to review the development of the run and to institute the special closures that insured an adequate escapement to the spawning grounds.

The principal structures at Hell's Gate were completed on May 8, 1946, and were in operation for the sockeye runs between July 11 and the end of September. Had the fishways not been installed, serious loss of fish would have occurred again in this area. Construction was begun on a "high-level" fishway to overcome blockade conditions at levels above 50 feet during the winter of 1946 to be completed in time to safeguard early runs passing at high water levels in the spring of 1947.

The fishways at Bridge River Rapids were completed on April 30, 1946, and operated successfully during the former block levels. The staff of engineers have designed a series of five fishways for Farwell Canyon and the easements and rights-of-way have been obtained by the Dominion Government. On Kynoch, Forfar and Rossette creeks log jams were removed in an effort to stabilize and define the stream beds and to allow sockeye to utilize a greater spawning area. Surveys of the obstructions on Weaver Creek, in the North Thompson and Quesnel watersheds, and for Black Canyon have been completed.

In 1946, pursuant to specific recommendation of the Commission, Canada and the United States regulated for the first time the sockeye salmon fishery in the waters defined by the treaty. In summary, the 1946 regulations were as follows:—

(a) The United States fishery and Canadian fishery to the south of Vancouver Island opened on July 25.

(b) The Canadian fishery in the Fraser River and the Gulf of Georgia opened on August 8.

(c) Weekend closures of 36 and 48 hours were allowed in the United States and Canadian waters, respectively.

(d) From June 1 to the opening of the sockeye fishery only a gill-net fishery with nets of 8-inch or longer stretched mesh was permitted.

Catch statistics of the 1946 run give a total of 7,791,383 sockeye landed from treaty waters or 98 per cent of the number landed in the cycle year, 1942. The Puget Sound catch was 3,551,761 fish, exceeding that for 1942 by 629,956. The total landings of Fraser River sockeye taken in Canada reached 4,239,622 fish in 1946, of which 2,552,439 or 60.2 per cent were taken by gill-nets.

In 1946 the Indians took 50,127 sockeye for food or 3,419 more than taken in 1942. This increase was distributed over the entire fishing area, except at Bridge River Rapids, and is a reflection of the general increase in the size of the "up-river" escapement.

The numbers of fish found on the spawning grounds is of especial significance in 1946 for it shows the effect of the protective regulations as well as free passage through Hell's Gate. The increase in the "up-river" runs is illustrated below:—

Tributary	1942	1946
Bowron River .....	1,826	6,951
Chilko River and Lake.....	34,109	59,000
Stellako River .....	48,640	245,779
Quesnel Lake .....	0	61
Raft River .....	450	3,000
Seymour River .....	1,950	2,619
Stuart Lake tributaries .....	8,198	9,609

A large run of sockeye spawned in Francois Lake (above the Stellako River)—the first time a large body of fish has ever been reported from this area. No estimate of the number of lake spawners was possible.

The dominant sockeye run of the 1942-1946 cycle spawning in tributaries to the South Thompson River, during October and November, totalled 2,388,000 sockeye in 1946. No comparative counts are available for 1942.

The biological study begun in 1941, 1942 and 1943 in the Quesnel area was resumed this year in preparation to the restoration of this formerly productive area.

Sockeye were tagged at the Sooke traps in order to obtain further information on their movements through the commercial fishery and on to the spawning grounds. During the closed period of June 1 to July 25, the Commission staff tagged all sockeye taken in the traps and as a result a total of 3,902 sockeye were tagged—two to three times more tags released than in any previous year.

Obstructions to sockeye migration were detected by a series of extensive tagging programs beginning in 1938. Such experiments were continued in 1946 with 6,730 tags released at Hell's Gate, 2,459 at Bridge River Rapids and 1,967 at Farwell Canyon. The results show that the fishways at Hell's Gate and Bridge River Rapids functioned efficiently over the levels for which they were designed and neither delay nor mortality was found. At Farwell Canyon conclusive proof of mortality was not only found at the main falls but throughout the upper reaches of the rapids.

Canadian members of the Commission were Mr. A. L. Hager, Chairman, Mr. A. J. Whitmore, and Mr. Tom Reid, M.P., while the United States members were Mr. Fred J. Foster, Secretary, Mr. Edward W. Allen, and Mr. Milo Moore, the latter having been appointed to the vacancy left by the resignation of Mr. Charles E. Jackson.

## INTERNATIONAL FISHERIES COMMISSION

Under authority of the treaty of January 29, 1937, for the preservation of the halibut fishery of the northern Pacific Ocean and Bering Sea, the International Fisheries Commission continued in 1946 the regulation of the Pacific

halibut fishery and carried forward the biological and statistical investigations of the fishery and of the stocks of halibut upon which the management of the fishery is based.

The regulations for 1946 became effective on March 6, after approval by the Governor General of Canada and the President of the United States. They were similar to those of previous years, though modified in a few respects to take care of developments in the ever-changing fishery.

To improve the utilization of the limited stock of halibut off northern California, Area 1, which extends south from Willapa Harbor in the State of Washington and closed each year at the same time as Area 2, was divided into Areas 1A and 1B. Provision was made for closure of Area 1B, the more northerly of the two areas, at the same time as Area 2 and for the closure of Area 1A, the southern section, at the same time as whichever of Areas 3 or 2 closed later. To discourage illegal fishing in Areas 1B or 2 after their closure, under pretence of fishing in Area 1A, any vessel fishing in Area 1A was required to have its licence validated at a port or place within Area 1A, prior to each fishing trip there, after closure of Areas 1B and 2.

As an aid to enforcement, an amendment was made to the regulation which allowed any vessel fishing with setlines for other species in closed areas to secure a permit to retain for sale one pound of halibut for each seven pounds of saleable fish of other species. In 1946, a vessel with such a permit was allowed to possess more halibut than it could sell legally, provided that such additional halibut did not exceed 30 per cent of the amount of halibut which could be sold and that such additional halibut was forfeited and surrendered to an enforcement officer at the time of landing. To strengthen the enforcement of this regulation, both dealers and captains were required to report the arrival of vessels fishing under permit to an enforcement officer and to secure permission to unload them.

Halibut fishing in 1946 began on May 1, with catch limits of 24,500,000 and 28,000,000 pounds for Areas 2 and 3, respectively, as in 1945. It ended in Areas 2 and 1B on June 11 when the Area 2 limit was attained and in Areas 3, 4 and 1A on August 19 when the Area 3 limit was reached.

Landings of Pacific Coast halibut from all areas by Canadian and United States fleets in 1946 amounted to 60,391,000 pounds, which was 5,726,000 pounds more than in 1945. Landings were 16,169,000 pounds, worth \$3,000,000 to the fishermen, above the low production in 1931.

Halibut landings from the different areas during the open season were: 549,000 pounds from Area 1A, south of Cape Blanco, Oregon; 173,000 pounds from Area 1B extending from Cape Blanco to Willapa Harbor, Washington; 27,250,000 pounds from Area 2, between Willapa Harbor and Cape Spencer, Alaska; and 31,187,000 pounds from Area 3 extending west from Cape Spencer to Cape Sagak in the Aleutian Islands. An additional 1,228,000 pounds of incidentally caught halibut were landed from Area 2 by setline vessels fishing for other species under permit between the time of closure and midnight November 15 when such permits became invalid. No landings were reported from Area 4, which included the Aleutian Island region and Bering Sea.

The Canadian halibut fleet caught 18,372,000 pounds of halibut in 1946 which was 3,071,000 pounds more than in 1945, and nearly three times as much as in 1932. Its Area 2 catch was 14,310,000 pounds, or 51 per cent of the area total. In Area 3 it caught 4,062,000 pounds or 13 per cent of the total. These shares of the area totals exceeded those of 1945 which were 47 per cent for Area 2 and 12 per cent for Area 3 and, up to that time, the highest since regulation began.



Statistical and biological investigations were continued by the Commission to measure the success of regulation and to provide a sound basis for the further rehabilitation of the fishery. Biological investigations at sea made vessel operations necessary.

The abundance of halibut as measured by the catch per unit of fishing effort was 6 per cent above that of 1945 in Area 2. In Area 3, it declined 5 per cent, continuing the decline of the previous year. With these changes, the abundance of halibut in 1946 was 145 per cent and 95 per cent above the 1930 levels in Areas 2 and 3, respectively.

The moderate decline in abundance in Area 3 was not viewed with alarm because of the generally sound condition of the Area 3 stock and the occurrence of natural fluctuations in abundance and availability. Nevertheless, it indicated that, with the current high annual rate of production, very close observation and control must be maintained to prevent any sustained reversal in the upward trend of abundance.

Observations of the changes occurring in the size and age composition of the larger and partly rehabilitated stocks of halibut in Area 2 were continued. More than 18,000 halibut were measured from 16 trips landed at Seattle from a selected and representative ground in Area 2. Materials for the determination of the age composition of the samples were secured from 3,000 of the fish measured. Preliminary analysis of these data demonstrated that the number of young halibut entering the fishery had more than balanced the loss from natural death and from fishing in the previous year. These incoming sizes contributed to the improvement in the catch per unit of effort in the area.

Vessel operations, using an otter-trawl vessel, were undertaken to study the effect that the recent expansion of the Pacific otter trawl fishery to important halibut producing grounds in Area 2 might be expected to have upon the stocks of halibut. This expansion was a matter of concern to the Commission because such gear has been demonstrated to be very effective in catching halibut and capable of catching and destroying small halibut long before they reach the most productive commercial size.

The Canadian otter trawl vessel *Santa Maria I.* was chartered and operated for a period of 81 days from mid-July to early October. During this time a total of 117 hauls were made in several sections of Hecate Strait and Dixon Entrance. Extensive information with a direct bearing on regulation was collected, including data concerning the distribution of small unmarketable halibut, the numbers and sizes of halibut caught by trawl on different grounds, and the mortality of halibut caught by trawl under various conditions.

The trawling operations were also used to collect biological materials for age and growth studies and to undertake a comprehensive tagging program. A sample of 1,886 halibut was tagged, a greater number than could have been expected had a longline vessel been utilized for tagging alone. Recoveries from these tagging experiments will, over a period of years, provide valuable information regarding the migratory habits of the different sizes of halibut and regarding natural and fishing mortality rates now existing in the partially rehabilitated stocks of halibut in Hecate Strait and Dixon Entrance.

Following a public hearing at Seattle, Washington, on November 29, 1945, to consider repeated recommendations by the halibut fleets for revision of the 1937 treaty to make it a better instrument for the rehabilitation of the halibut fishery, a report was prepared by the Commission and transmitted to the Governments of Canada and the United States. This summarized the Commission's success in rebuilding the halibut fishery. It reviewed developments in the halibut fishery and in fisheries for associated species which were interfering with the attainment of the Commission's conservation objectives. The



report presented and discussed the proposals of the fishing fleets for broader regulatory authority to permit more effective regulation of the fishery under existing conditions. It recommended some of the proposals to the consideration of the Governments.

On November 26, the Commission held its yearly meeting with the Halibut Conference Board, composed of representatives of the Canadian and United States halibut fleets. The statistics of the fishery and the biological findings of the Commission were reviewed in detail and recommendations of the fleets concerning regulation of the fishery in 1947 were received.

The annual meeting of the Commission was held at Seattle on November 25 and 26, before and after the meeting with the Halibut Conference Board. The condition of the fishery was examined in the light of current investigations, the recommendations of the fleets were considered, and regulatory changes adopted.

United States representation on the Commission changed shortly before the annual meeting when Mr. Charles E. Jackson of Washington, D.C., resigned and Mr. Milton C. James, Assistant Director of the United States Fish and Wildlife Service, Washington, D.C., was appointed to fill the vacancy. Continuing members of the Commission were Mr. G. W. Nickerson, Prince Rupert, and Mr. A. J. Whitmore, Department of Fisheries, Ottawa, for Canada and Mr. Edward W. Allen, Seattle, Washington, for the United States. Mr. Allen served as Chairman and Mr. Nickerson as Secretary.

STEWART BATES,  
*Deputy Minister.*

## APPENDIX No. 1

### ANNUAL REPORT OF THE CHIEF SUPERVISOR OF FISHERIES (A. J. WHITMORE) FOR THE WESTERN DIVISION (BRITISH COLUMBIA) FOR 1946

With a marketed value only slightly below that of the record year of 1945, the fisheries production in British Columbia for 1946 amounted to \$43,817,147. The salmon production was again the predominant factor, the total valuation derived from this species being \$24,346,483. The principal varieties making up the provincial total are shown in the following statement:

	Marketed Value
Salmon .....	\$24,346,483
Herring .....	9,574,643
Halibut .....	3,736,441
Fish livers, etc. ....	1,818,542

#### SALMON

The aggregate catch of salmon was somewhat less than in the preceding year, due primarily to a general failure of the pink salmon runs throughout the coast. The pack of all varieties of salmon totalled 1,348,137 cases, compared with a total of 1,739,308 cases in the previous year. This compares with an average of 1,450,957 cases for the past five years, as shown below.

The outstanding features of this year's production were the large anticipated return of sockeye to the Fraser, and the strong supplies of chum salmon, particularly in Fisheries District No. 2:

	Cases
1927-1931 .....	1,540,744
1932-1936 .....	1,467,815
1937-1941 .....	1,694,432
1942-1946 .....	1,450,957

## SOCKEYE

The pack of 543,027 cases of sockeye was considerably above average for recent years. The pack in the previous year amounted to 329,001½ cases, while the average for the past five years is 390,241 cases. The following table shows the averages in five-year groups since 1927:

	Cases
1927-1931.....	312,404
1932-1936.....	337,162
1937-1941.....	372,963
1942-1946.....	390,241

As stated above, the *Fraser* area yielded the predominant part of the sockeye pack, being the return expected from the large run of four years ago to the Adams-Shuswap section of the Fraser spawning grounds. The catches at the *Naas* river, and *Rivers* and *Smiths Inlets* were below those secured in the cycle years, whereas that for the *Skeena* showed some improvement. For the *Naas* area it may be said that a very substantial escapement took place prior to the commencement of fishing, which, with distinctly subnormal fishing effort, contributed to the decreased landings.

The expected large sockeye return to the *Fraser*, and the high price being paid for sockeye, resulted in a great concentration of fishermen for this run. In all, some 3,738 salmon gillnet fishermen were licensed for the Fraser. Many of these, however, were inexperienced and met with poor success.

The Fraser sockeye fishery for the first time was governed by special regulation recommended by the International Pacific Salmon Fisheries Commission.

## COHOES

The runs produced 97,240½ cases, compared with 171,983 cases in the brood year. Inasmuch as large quantities of coho are used in fresh and frozen form, the total pack in canned form is not a true indication of the volume of the runs. It is a fact, however, that the 1946 runs were below normal, and, in view of the intensified fishing effort in various forms for this variety, there is reason for some anxiety as to the developing status of this fishery. The 1946 canned pack compares with an average of 159,513 cases packed during the past three years, as shown below:

	Cases
1932-1934.....	164,543
1935-1937.....	180,829
1938-1940.....	237,055
1941-1943.....	240,412
1944-1946.....	159,513

## PINKS

A pack of only 116,607½ cases was produced, being the lowest on record since this variety of salmon was used in any quantity for canning purposes. It compares with a pack of 825,512½ cases in 1945 and 389,692 cases in the brood year of 1944. The run to all areas was very light and the pack was further reduced by sharp restrictions which were applied, as the season developed, in order to secure a reasonable escapement for reproduction purposes. There is no explanation immediately available for the extreme variation in the annual abundance experienced with this variety. The average annual packs since 1933, by two-year groups, are shown below:

	Cases
1933-1934.....	483,641
1935-1936.....	553,249
1937-1938.....	493,226
1939-1940.....	417,253
1941-1942.....	349,194
1943-1944.....	459,940
1945-1946.....	471,059

## CHUMS

A total pack of 576,133½ cases was realized, compared with an average during the past four years of 466,450 cases. The run generally was much heavier than expected and it yielded an abundant spawning population, in addition to the large commercial utilization. The annual average production, by four year grouping, is as follows:

	Cases
1927-1930.....	562,865
1931-1934.....	292,393
1935-1938.....	499,126
1939-1942.....	646,083
1943-1946.....	466,450

## INSPECTION OF CANNED SALMON

The following details show the results of canned salmon inspection during the year at the Canned Fish Inspection Laboratory maintained by the Department in Vancouver:

Number of inspections made.....	1,301
Total number of cases inspected.....	1,352,510
Total number of cases below "Grade "A" standard.....	21,022½
Total number of cases eligible for Grade "A" certificate.....	1,331,487½

## DETAILS OF INSPECTIONS ACCORDING TO SPECIES

Species	Number of cases inspected	Number of Cases below Grade "A" Certificate Standard	Number of Cases eligible for Grade "A" Certificate
Sockeye.....	542,499	8,669½	533,829½
Springs.....	8,210½	36	8,174½
Steelheads.....	4,477	.....	4,477
Bluebacks.....	2,952½	145	2,807½
Cohoe.....	101,134	3,604	97,530
Pinks.....	119,388	3,061	116,327
Chums.....	573,849	5,507	568,342
Totals.....	1,352,510	21,022½	1,331,487½

## PARTICULARS OF SALMON BELOW GRADE "A" STANDARD ACCORDING TO SPECIES

Species	Grade "B"	Tips and Tails	Minced, Flakes, etc.	Below Grade "B" Minced	Totals
Sockeye.....	1,313	4,753	2,011	592½	8,669½
Springs.....	4	20	12	.....	36
Steelheads.....	.....	.....	.....	.....	.....
Bluebacks.....	.....	106	39	.....	145
Cohoe.....	.....	2,695	909	.....	3,604
Pinks.....	3,009	52	.....	.....	3,061
Chums.....	1,254	20	4,233	.....	5,507
Totals.....	5,580	7,646	7,204	592½	21,022½

The report of the Chief Chemist, covering the operations at the Laboratory during the year, will be found as Appendix No. 6.

Salmon inspection fees collected at the rate of one-half cent per case amounted to \$6,738.08.

SALMON FOR UNITED KINGDOM

The British Ministry of Food and other government agencies took over 800,000 cases of the British Columbia canned salmon pack. Five hundred thousand cases were reserved for domestic consumption, being the largest quantity for Canadian distribution since 1941. Particulars of the distribution of the 1946 pack, together with that of the five preceding years are shown below:

—	1941	1942	1943	1944	1945	1946
	Cases	Cases	Cases	Cases	Cases	Cases
TOTAL PACK:.....	2,248,870	1,812,254	1,255,508½	1,097,557½	1,737,311	1,348,138½
<i>Distribution—</i>						
Canada.....	549,178½		200,000	250,000	304,000	500,000
Canadian Red Cross.....	17,599	49,851	50,000	52,000		
Department of Munitions and Supply.....		14,227	50,000	20,000	30,000	
Australia.....	37,112½					27,401
South Africa.....	2,507½					958
Other Countries.....	10,140½					
*B.W. Indies, Africa and Ships' Stores.....		52,620				
British West Indies.....			38,247			
Eastern Hemisphere.....			33,670			
L.F.C. Areas.....				147,112½		16,863
Sub-Grade Salmon.....	113,973½					
Samples, culls, etc.....		2,402				
British Ministry of Food	1,518,358½	1,693,154	883,591½	628,445	1,405,311	802,916½

\* After the year 1942 "Ships' Stores" were included under the Department of Munitions and Supply.

The prices received by the canned salmon producers from the British Ministry of Food were as follows:

—	1-lb. tall cans 48 cans to case	½-lb. flat cans 96 cans to case	¼-lb. flat cans 96 cans to case
	\$ cts.	\$ cts.	\$ cts.
<i>Grade A Salmon:</i>			
Group I.....	17 65	18 90	11 20
Group II.....	12 90	14 15	8 82½
Group III.....	7 65	8 90	5 70
<i>Tips and Tails, Minced or Flaked Salmon, and Grade B Salmon:</i>			
Group I.....	13 85	15 15	9 30
Group II.....	11 20	12 50	8 00
Group III.....	6 75	8 00	5 25
<i>Grade B. Tips and Tails and Minced or Flaked Salmon:</i>			
Group I.....	10 10	11 35	7 40
Group II.....	9 55	10 80	7 15
Group III.....	5 85	7 10	4 80

SALMON TAKEN BY INDIANS OF THE PROVINCE FOR PURPOSES OF THEIR OWN FOOD SUPPLIES, UNDER FREE PERMIT

—	Sockeye (fish)	Springs (fish)	Coho (fish)	Pinks (fish)	Chums (fish)	Steelheads (fish)	Total (fish)
District No. 1.....	45,483	5,775	2,710		6,140	2,300	62,408
District No. 2.....	66,500	3,535	16,270	11,066	18,400	4,920	120,691
District No. 3.....	5,383	3,685	5,320	5,833	55,640	190	76,051
Totals.....	117,366	12,995	24,300	16,899	80,180	7,410	259,150



## HALIBUT

Halibut fishing opened on May 1, under the regulations of the International Fisheries (Halibut) Commission, this opening date being similar to that of the previous season. Area No. 2 was closed on June 8, after a season of 39 days only, by which time the quota of halibut for that area had been taken by the Canadian and United States fishing fleets. Area No. 3 closed on August 17, compared with September 24 in 1945.

The total landings at all points in British Columbia amounted to 228,739 hundredweights, compared with 194,763 in the previous year.

Landings by Canadian vessels were the heaviest for many years; on the other hand the landings by United States vessels were lighter. The following statement shows the landings at the several centres in the province since 1930:

Year	Vancouver and New Westminster	Prince Rupert	Butedale- Namu Area	District No. 3	Totals
	(cwts.)	(cwts.)	(cwts.)	(cwts.)	(cwts.)
1930.....	11,387	239,617	978	2,814	254,796
1931.....	8,498	167,757	3,727	2,123	182,005
1932.....	11,883	148,615	6,677	1,672	168,847
1933.....	13,436	144,065	10,431	2,440	170,372
1934.....	16,113	150,476	13,297	2,716	182,602
1935.....	22,351	129,586	15,713	3,493	171,143
1936.....	20,777	131,830	11,522	3,992	168,121
1937.....	23,334	147,638	12,676	3,777	187,425
1938.....	28,155	141,691	17,776	5,866	193,488
1939.....	30,225	173,857	18,651	4,455	227,188
1940.....	26,010	185,921	23,157	3,955	239,043
1941.....	22,057	166,513	30,946	10,142	229,658
1942.....	30,547	180,789	21,638	10,941	243,915
1943.....	44,201	180,507	12,063	13,323	250,034
1944.....	30,779	133,744	12,356	12,369	189,248
1945.....	21,151	152,828	13,326	7,458	194,763
1946.....	15,970	186,896	17,493	8,380	228,739

## HERRING—GENERAL

The total tonnage of herring taken by fishermen during the year amounted to 106,182.55, used as follows:

—	Dist. No. 1	Dist. No. 2	Dist. No. 3	Total	Green Tons
Catch..... cwts.	4,900	321,208	1,797,543	2,123,651	106,182.55
PRODUCTION—					
Marketed fresh..... cwts.	5,011	1,203	1,369	7,583	379.15
Canned..... cases	1,102,967	59,312	155,428	1,317,707	52,527.35
Frozen..... cwts.	18,781	8,647	200	27,628	1,381.40
Kipperd..... cwts.	4,601	98	687	5,386	807.90
Bloaterd..... cwts.	95		8	103	10.30
Used for bait..... bbls.	4,469	15,171½	12,795	32,435½	3,243.55
Pickled..... bbls.	1,289			1,289	193.35
Dry Salted..... cwts.			86,790	86,790	5,424.50
Kipperd Snacks..... cs.	24,515			24,515	4,903.00
Herring Oil..... Imp. gals.	400,934	165,878	280,419	847,231	37,249.55
Herring Meal..... tons	2,911	2,003.9	3,548.6	8,463.5	
Salt cured..... bbls.			1,000	1,000	62.50
					106,182.55

A total of 1,317,707 cases was canned during the year, as shown below, with a marketed value of \$6,932,943:

Year	Cases
1939.....	233,046
1940.....	727,292
1941.....	1,013,329
1942.....	1,540,918
1943.....	1,372,775
1944.....	1,130,527
1945.....	1,372,614
1946.....	1,317,707

The herring fishing fleet is fully modern, each vessel being equipped with echo sounding device for locating herring schools. To aid in their mobility in moving from one fishing ground to another the equipment on these vessels includes radiotelephones and direction finders.

HERRING INSPECTION

The following are the detailed results of the year's inspection of canned herring at the Canned Fish Inspection Laboratory maintained by the Department in Vancouver:

CANNED HERRING INSPECTIONS FOR YEAR 1946

Number of inspections made.....	395
Total number of cases inspected .....	1,362,205½
Total number of cases below certificate standard .....	nil
Total number of cases eligible for certificate .....	1,362,205½

DETAILS OF CANNED HERRING INSPECTIONS ACCORDING TO SIZES

Size	Number of cases inspected	Number of cases below certificate standard	Number of cases eligible for certificates
<i>Plain:</i>			
1-lb. Talls.....	161,351½	.....	161,351½
1-lb. Ovals.....	650,903	.....	650,903
½-lb. Ovals.....	34,118	.....	34,118
Total.....	846,372½	nil	846,372½
<i>Tomato Sauce:</i>			
1-lb. Talls.....	65,581	.....	65,581
1-lb. Ovals.....	410,734	.....	410,734
½-lb. Ovals.....	39,518	.....	39,518
Total.....	515,833	nil	515,833
Total canned herring in natural oil.....			846,372½
Total canned herring in tomato sauce.....			515,833
Total pack .....			1,362,205½

Inspection fees collected at the rate of one-half cent per case amounted to \$7,405.07.

PILCHARDS

The total catch of pilchards was 3,491 green tons, which was disposed of as follows:

	Quantity	Value
Caught and landed.....tons	3,491	\$ 76,829.00
Marketed—		
Canned .....	4,359	19,615.00
Used as bait.....cases	70	280.00
Pilchard oil .....	686,431	149,306.00
Pilchard meal .....	673.1	44,552.00
Total marketed value.....		\$ 213,753.00

This fishery was virtually a failure. Notwithstanding intensive prospecting by a well-found pilchard fishing fleet throughout the usual fishing areas of the west coast of Vancouver Island, the measure of success in locating pilchard schools during 1946 was negligible.

### VIOLATIONS

The prosecutions during the year totalled 345, involving violation of various fishery regulations. A total revenue of \$12,989.22 resulted from this source. Details are as follows:

—	District No. 1	District No. 2	District No. 3	Totals
Prosecutions.....	224	48	73	345
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Fines.....	3,044 00	2,135 00	1,953 50	7,132 50
Sales.....	1,022 24	3,689 80	1,144 68	5,856 72
Total: Fines and sales.....	4,066 24	5,824 80	3,098 18	12,989 22

### EXPORT PERMITS

On behalf of the Department of Trade and Commerce, export permits for fish products were issued, as shown below:

—	Vancouver Office	Victoria Office	Prince Rupert Office	Totals
U.S.A.....	524	140	118	782
British Empire.....	230			230
Other Countries.....	365			365
	1,119	140	118	1,377

### GRAYFISH OPERATIONS

The following statement shows details of this fishery for 1946, compared with recent years. It will be noted that there is a continued reduction in the number of licences issued and the quantity of livers landed:

Year	Licences issued	Liver Landings	Average price to fishermen
		(lbs.)	(cents)
1940.....	406	1,566,500	6
1941.....	898	3,552,576	9
1942.....	1,235	4,241,286	16
1943.....	2,049	5,121,186	25
1944.....	3,066	7,769,574	34
1945.....	2,170	5,821,849	31
1946.....	1,409	2,844,217	31

## DEPARTMENT OF FISHERIES

## CLAMS

The following statement shows a pack of 23,867 cases of clams, the largest since 1934. This is due to relaxation of export controls and the favourable price offering in export markets:

Year	Marketed Fresh (cwt.s.)	Canned (cases)
1934.....	6,332	5,815
1935.....	15,716	10,209
1936.....	26,530	12,579
1937.....	27,018	12,587
1938.....	42,169	22,155
1939.....	21,601	5,431
1940.....	20,785	7,151
1941.....	25,402	12,783
1942.....	8,278	17,808
1943.....	8,397	13,626
1944.....	9,869	12,474
1945.....	39,834	4,693½
1946.....	15,456	23,867

## TUNA

The following statement shows the quantity of tuna landed in British Columbia ports during the past seven years, and that the 1946 operations suffered a significant decline from the preceding year. Notwithstanding improved facilities in the way of well-found boats and equipment engaged in the 1946 operations, they were not successful in locating tuna in the substantial quantities found in 1945, on the grounds prospected since 1939 from 50 to 150 miles off the coasts of British Columbia, Washington, and Oregon. All the tuna landed at British Columbia ports during the year was frozen in Canadian cold storage plants and later exported to the United States for canning. Canning within the province was not practicable owing to the low Canadian ceiling on canned tuna:

Year	Quantity (cwt.s.)	Value (\$)
1939.....	2,838	14,190
1940.....	45	225
1941.....	760	6,840
1942.....	—	—
1943.....	288	5,760
1944.....	4,636	79,676
1945.....	14,287	297,983
1946.....	4,316	85,113

## DESTRUCTION OF SEA LIONS

Measures for the control of sea lions along the coast of British Columbia at points where there was definite evidence of interference both with fishing activities and by way of damage to gear, etc., were again taken. Destruction was undertaken by members of the crews of various departmentally operated patrol boats. The number destroyed during the year was 304, as follows:

Area	Number Destroyed
Thormanby Island .....	21
Cowichan .....	1
Kingcome Inlet .....	36
Knight Island .....	191
Isnor Rock .....	30
Joseph Rocks .....	15
Various rookeries .....	10
	<hr/> 304



## DESTRUCTION OF HAIR SEALS

Claims for 1,949 hair seals, destroyed by fishermen, were paid, at the prevailing bounty rate of \$5 each, totalling \$9,745.

## ANCHOVIES

As the following statement shows there has been marked development in anchovy fishing during the war years. Through advice and assistance from the Pacific Experimental Station of the Fisheries Research Board, the processing technique has been improved and it is hoped that there will be a continuation of this branch of the industry in the post-war years. It is a fact that there is still a considerable gap in the data available concerning the characteristics and life history of the anchovy on this coast, and that until greater information is available there may be uncertainty as to the volume and source of supply at the various fishing grounds along the coast:

Year	No. of Cases*	Marketed Value
1939.....	—	—
1940.....	14,331	\$ 79,818.00
1941.....	2,181	15,617.00
1942.....	3,070	11,900.00
1943.....	2,099	11,483.00
1944.....	13,221	261,160.00
1945.....	4,957	82,545.00
1946.....	29,946	610,586.00

\* In terms of 48 lb. cases, but the general product is packed in cases of 48 x 4-ounce cans.

## EFFICIENCY OF FISHING AND PROCESSING OPERATIONS

In line with the experience of the past, the British Columbia industry continues to keep abreast of technical and scientific development, in so far as such are capable of application in fishing and fish processing procedure and routine. More and more of the larger fishing vessels are being fitted with navigational aids, depth finders, radiotelephones, and other similar refinements, including improved living conditions for crews, all greatly contributing to the over-all efficiency in locating and catching fish. These aids make for great mobility as it is feasible to direct and move these fish catching units quickly from one area to another as fish indications may make desirable from the standpoint of the fishing operators. While all these improvements add to the immediate benefit and welfare of the industry, they constitute and present a condition to which the Department and its officers must give serious and constant consideration from the standpoint of the Department's conservation program, and the problems confronting the administrative and protective officers in their responsibilities for safeguarding supplies for the future.

## STAFF REORGANIZATION

Preliminary arrangements were completed during the year, looking to re-organization and enlargement of the Department's administrative and protective personnel and facilities in British Columbia. As a start, during the year seven able and well-found vessels of sixty and sixty-five foot type, formerly in service of the R.C.A.F. were acquired to replace obsolete craft. Two steel, 115-foot fishery protection cruisers—*Howay* and *Laurier*—were also secured from the naval service to replace the *Malaspina* and *Givenchy*, formerly on fisheries protection coastal duty. Steps are in hand for re-engining these vessels, which are calculated, by reason of size, design, and general appointments, to be particularly

well suited for this service. Further vessel acquisitions are contemplated. All these boats are being equipped with radiotelephones and other recent aids, to meet the need for increased mobility in required duties, having regard to the increasing efficiency and mobility of the British Columbia fishing fleet generally.

Through the agency of the Civil Service Commission, the appointment of some forty-four new fishery inspectors for assignment to the various coastal points is proceeding. A preliminary of significant importance to their appointment is a three-months qualifying course of instruction to fit them for essential duties. All candidates are young war veterans and preliminary indications would suggest that valuable material is being recruited through this medium for ultimate service in senior fishery administrative posts.

The augmented personnel facilities were urgently needed to meet a depletion which had progressively gone on during the war years, and because of war conditions could not be effectively taken care of then. The urgency for improved conservation and protective services is further accentuated by the consistent advances in fishery methods, fishing gear and aids, by the British Columbia fishing industry, a characteristic of which has never been tardiness or backwardness in employing and devising the latest up-to-the-minute fishing and fish processing technique and science.

#### REMOVAL OF OBSTRUCTIONS IN SALMON STREAMS

Fisheries administrative and protective officers continued to give close attention to the condition of streams; from the standpoint of clearing log jams and other obstructions where such were found to be blocking or interfering with the ascent of fish for reproduction purposes. By this means potential obstructions often were relieved before any serious damage could take place, by prompt attention and action on the part of the local officers. There is urgent need for the services of a full-time fisheries engineer to assist the local officers, and while efforts on the part of the Civil Service Commission to find a suitable appointee have not been successful so far, it is hoped that the appointment of such an officer will materialize very shortly.

A more detailed account of the work done in removing obstructions, etc., is contained elsewhere in the Department's report.

#### SPORT FISHING

Now that restrictions and controls which had the effect of curtailing sport fishing activities in tidal waters during the war years have been removed, there has been increasing interest in sport and pleasure fishing throughout the coastal region. Near centres of population there has been renewed interest in the establishment of boat liveryies where rowboats as well as small power boats may be rented for the purpose of participating in the excellent grilse and salmon fishing which prevails seasonally in the various areas. An industry which is involved in the establishment of these boat liveryies and associated facilities is becoming of significant importance in the fisheries economy of British Columbia and the Dominion. This tidal sport fishery also contributes largely to British Columbia attractions from the standpoint of tourists.

The increasing interest and participation in our salmon fisheries for sport and pleasure, and the increasing economic returns therefrom, has already made necessary closer attention to this phase by departmental officers, and it is the intention that there should be a continuation of this attention and consideration to meet developing conditions from the standpoint of the welfare of the sport fishing activities and the conservation of our salmon and other fishery resources.

## STAFF RETIREMENTS

As the undernoted list will immediately disclose, the Department lost during the year the services of a number of experienced senior personnel, through retirement. Heading this list is Major J. A. Motherwell, whose 33 years of service included 25 years as Chief Supervisor of Fisheries in British Columbia. Ordinarily the passing from service of departmental officers of this status would leave a void of significant proportions. The industry and departmental officers will unquestionably sense this to a greater extent than usual, until the depleted staff of experienced departmental administrative officers can be rebuilt and reorganized:

Major J. A. Motherwell, Chief Supervisor of Fisheries, Vancouver, 33 years of service; W. M. Chapman, Departmental Accountant, Vancouver, 33 years of service; R. W. MacLeod, Supervisor of Fisheries, New Westminster, 21 years of service; F. J. Winlow, Inspector of Fisheries, Squamish-Lillooet area, 21 years of service; T. K. Lightly, Inspector of Fisheries, North Vancouver area, 16 years of service; G. L. Stock, Inspector of Fisheries, Vancouver area, 24 years of service; and J. S. Menchions, Fishery Patrolman, Vancouver-Howe Sound area, 30 years of service.





LICENCES ISSUED BY PROVINCIAL FISHERIES DEPARTMENT DURING THE  
1946 SEASON

Kind	Number
Salmon Cannery (2 did not operate).....	33
Herring Cannery .....	23
Pilchard Cannery .....	7
Shellfish Cannery .....	11
Herring Reduction Plant.....	13
Pilchard Reduction Plant.....	7
Dogfish Reduction Plant.....	2
Fish-liver Reduction Plant.....	9
Fish-offal Reduction Plant.....	17
Herring Dry-saltery .....	9
Tierced Salmon Plant.....	10
Pickled Herring Plant.....	3
Cold Storage Plant.....	16
Fish-buyers' Licences .....	487
Non-tidal Fishing Licences.....	126
Sturgeon Fishing Licences.....	3
Fish-processing Plant .....	20
Aquatic Plants Processing Plant .....	2
Aquatic Plants Harvesting Licences .....	2
Total licences issued.....	800

STATEMENT OF DIFFERENT SPECIES OF SALMON AND METHOD OF CAPTURE  
REPORTED BY OPERATORS OF SALMON PURSE-SEINES, DRAG-SEINES AND TRAP-  
NETS AND BY SALMON CANNING, CURING AND COLD STORAGE ESTABLISH-  
MENTS, OF GILL-NET AND TROLL CAUGHT FISH—BRITISH COLUMBIA—SEASON  
1946.

Method of Capture	Sockeye	Springs	Blue- Backs	Steel- heads	Cohoe	Pinks	Chums	Totals
Troll.....	1,758	439,375	161,664	377	811,936	62,520	6,346	1,483,976
Gill-net.....	4,291,188	296,230	4,770	54,583	458,308	557,866	1,621,211	7,284,156
Purse-seine.....	2,753,056	16,887	6,127	1,349	242,247	2,812,824	5,187,085	11,019,575
Drag-seine.....	21,431	.....	.....	.....	12,580	1,836	3,765	39,612
Trap-net.....	36,941	27,976	.....	2,291	16,587	42	7,759	91,596
Totals.....	7,104,374	780,468	172,561	58,600	1,541,658	3,435,088	6,826,166	19,918,915

## DEPARTMENT OF FISHERIES

## STATEMENT OF NUMBER OF SALMON CAUGHT BY PURSE-SEINES, SHOWN BY SEINING AREAS BRITISH COLUMBIA—SEASON 1946

Area	Sockeye	Springs	Blue-backs	Steel-heads	Cohoe	Pinks	Chums	Totals
1.....	2,891	81	.....	365	11,543	295,135	27,441	337,456
2.....	37	4	44	.....	9,225	221,335	530,279	760,924
3.....	119,132	306	257	21	11,663	148,928	96,866	377,173
4.....	.....	.....	.....	.....	.....	.....	.....	.....
5.....	15,660	381	4,211	31	30,718	326,645	51,859	429,505
6.....	22,717	3,217	201	199	46,458	1,385,267	397,356	1,855,415
7.....	20,419	3,288	28	105	20,695	213,333	805,959	1,063,827
8.....	3,185	165	1,177	255	2,261	97,257	118,508	222,808
9.....	82	63	.....	6	2,132	4,379	183,571	190,233
10.....	10	23	.....	.....	1,929	14,234	108,884	125,080
11.....	1	.....	.....	.....	2,633	11,810	53,274	67,718
12.....	321,574	6,049	26	244	33,288	66,638	1,175,908	1,603,727
13.....	181,264	1,797	63	104	15,636	27,223	741,520	967,607
14.....	229,330	554	.....	.....	833	19	119,220	350,006
15.....	.....	1	.....	.....	113	.....	13,859	13,973
16.....	4,252	1	.....	.....	126	.....	21,321	25,700
17.....	1,200,000	818	115	15	2,365	595	12,036	1,221,738
18.....	.....	6	1	.....	8	.....	5,750	.....
19.....	.....	.....	.....	.....	29	.....	.....	.....
20.....	586,225	81	3	1	2,844	2	386	589,542
21.....	32,703	28	1	.....	4,671	24	15,871	53,298
22.....	.....	3	.....	.....	1,612	.....	74,460	76,075
23.....	650	20	.....	3	6,142	.....	228,924	235,739
24.....	12,924	.....	.....	.....	6,644	.....	68,324	87,892
25.....	.....	.....	.....	.....	13,652	.....	282,143	295,795
26.....	.....	.....	.....	.....	.....	.....	20,872	20,872
27.....	.....	1	.....	.....	14,977	.....	32,494	47,472
Totals.....	2,753,056	16,887	6,127	1,349	242,247	2,812,824	5,187,085	11,019,575

## RECAPITULATION OF FISH LIVERS AND FISH VISCERA SUMMARIES—1946

Species	Purchased Pounds	Value to Fishermen	In Cold Storage		Liver Oil		Total Value Marketed or Prepared for Market
			Pounds	Value	Pounds	Value	
		\$		\$		\$	\$
Gray Cod Livers.....	55,407	3,071	1,375	82	6,714	2,038	2,120
Black Cod Livers.....	56,635	67,029	22,965	28,505	5,435	52,538	81,043
Black Cod Viscera.....	58,381	6,036	2,988	297	296	1,304	1,601
Ling Cod Livers.....	176,699	253,116	22,070	40,320	17,389	228,224	268,544
Ling Cod Viscera.....	163,871	12,908	11,145	1,334	23,402	10,709	12,043
Red Cod Livers.....	30,468	26,435	8,599	9,802	1,341	11,622	21,424
Red Cod Viscera.....	7,898	1,039	.....	.....	956	335	335
Halibut Livers.....	259,303	159,180	22,011	15,052	32,442	186,377	201,429
Halibut Viscera.....	289,251	29,499	11,148	1,115	19,140	69,036	70,151
Grayfish Livers.....	2,844,217	888,075	42,161	12,258	1,843,232	1,098,569	1,110,827
Soupin Shark Livers.....	9,005	23,973	1,536	4,316	5,005	32,870	37,186
Ratfish Livers.....	16,350	675	846	34	9,988	1,165	1,199
Miscellaneous Shark Livers.....	15,024	4,308	184	59	8,000	4,755	4,814
Miscellaneous and Scrapfish Livers.....	32,322	1,819	1,733	126	7,213	3,603	3,729
Mixed Cod Viscera.....	2,513	299	.....	.....	920	1,097	2,097
Total values.....	4,017,344	1,477,462	148,761	113,300	1,981,473	1,704,242	1,818,542

## SALMON SPAWNING REPORT, 1946

*Sockeye*.—Good supplies were found in the Naas, Skeena, Bella Coola, Rivers Inlet, and Smiths Inlet areas. In the Fraser River system, due in part to the later opening date for sockeye fishing in the commercial fishing areas, in conjunction with improved conditions at Hell's Gate, there was a general increase in the numbers of spawning fish over practically the whole watershed. Increases of exceptional note occurred in the Fraser-Francois, upper Bowron, and Chilcotin River systems. The heavy, late run to Adams River was up to expectations, although possibly slightly fewer in numbers than in 1942. Satisfactory supplies reached the grounds tributary to the lower portion of the Fraser.

*Springs*.—With few exceptions, the seeding of spring salmon was fairly satisfactory, and generally indicates a slight improvement over recent years.

*Coho*s.—The supply in the northern district was below brood year levels. Fairly satisfactory seedings occurred in the Naas, lower Skeena, and Grenville-Principe areas, but numbers in the remaining areas ranged from light to medium. In the southern portion of the province supplies were light in all areas.

*Pinks*.—The run of pink salmon was disappointingly light, late in making an appearance, and the individual fish unusually small in size. Due in part to the extra conservation measures, the escapement to the more important northern areas, excepting the Naas, was medium. There was also a fair seeding of the grounds in the upper portion of the East Coast of Vancouver Island area. Supplies in the Naas and other parts of the province were light. It was the "off year" in the Fraser River area.

*Chums*.—Generally speaking, supplies in the more important chum salmon areas over the province were fairly satisfactory, particularly so in District No. 3.

## IN DETAIL

*Queen Charlotte Islands Area—North*

Fair supplies of coho were found on the spawning grounds tributary to this area. Although the run of pinks to Massett Inlet and Naden Harbour was very light, there was a medium escapement to all streams. A light seeding of chums occurred over the area, exceptions being a medium seeding of the Ain River in Massett Inlet and a heavy run to Naden River. Extra conservation measures were enforced to protect the pink salmon run.

*Queen Charlotte Islands Area—South*

There was a light to medium escapement of coho. The seeding of pinks was generally light with the exception of a heavy escapement to Copper and Skeedans rivers, and a very heavy showing in Pallant River, Cumshewa Inlet. The chum seeding was medium in Skidegate Inlet, heavy in Pallant Creek, and light in the other streams in Cumshewa Inlet, light in the area between Cumshewa Inlet and Lockeport and heavy in the area south of Lockeport to Cape St. James. Unusual conservation measures were enforced in this area, as well, to protect the chum salmon runs.

*Naas Area*

A satisfactory escapement of sockeye occurred to the Meziaden Lake area, the principal spawning grounds of this variety in the Naas system. The inspecting officers report a slightly larger run than in 1945. Good supplies of spring salmon reached the several streams, with the exception of the Tseaux River, where the escapement was small. The supplies of coho were satisfactory. The pink salmon seeding over the whole area was light. The chum seeding was satisfactory over the area, especially so in the Warke Channel and Portland Canal areas. A marked improvement was also noted in Khutzeymateen Inlet.



*Upper Skeena Area*

The inspecting officer reports a satisfactory seeding of sockeye over the area. Good supplies reached the Babine Lake and River area. The numbers observed on the grounds in the individual streams compared favourably with the runs of the brood year of 1942. The fish were a good average size and it is estimated that females formed 60 per cent of the run. Good supplies also reached the Morice Lake area, tributary to the Bulkley River, but the numbers reaching the Kispiox and Kitwancool systems were somewhat below the levels of the brood years of 1941 and 1942. The spring salmon seeding was fairly satisfactory. Medium to heavy supplies appeared in the Babine and Morice Lake areas, but the runs to the Kispiox system and other streams were not quite so heavy. Although coho salmon were fairly numerous in some cases, the general seeding can only be considered light. The number of parent pink salmon reaching the streams in this area was small.

*Lower Skeena Area*

A fairly satisfactory escapement of sockeye occurred to this area. Good supplies were observed in Williams Creek, the principal spawning ground tributary to Lakelse Lake, but the smaller streams received only a light seeding. The run to Kalum Lake area was just fair, somewhat smaller than that of the cycle year, 1942. Satisfactory numbers reached Shawatlans Creek, and there was a medium showing in the Oestahl River system. The spring salmon seeding was good, especially in the Oestahl River system and Kalum Lake area. The escapement of cohoes was satisfactory. Fair supplies reached the Lakelse area, there was a good escapement to the Oestahl River, a heavy run to the Kalum Lake area. The pink seeding of the streams tributary to the lower Skeena was light but the coastal streams were well supplied with this variety. The number of chums on the spawning grounds was small.

*Lowe Inlet Area*

A medium escapement of sockeye was reported to all streams in the area frequented by this variety, with the exception of Minktrap Bay where seeding was fairly heavy. The coho supply was normal. Due in part to the extra conservation measures pink supplies in the northern portion of this area were satisfactory, especially so in the Porcher Island area, Alpha Bay, Kumealon Inlet, and Salmon River. The seeding of the southern portion of the area was not as heavy. Chum supplies were only fair.

*Butedale Area*

The sockeye streams in this area received a medium seeding. The supply of coho was also medium, and, in comparing the run with the brood year, although there was some decrease in the numbers observed in the larger streams, there was a definite increase in the quantities found in the smaller streams. Again, in this area, due in part to extra conservation measures, medium supplies of pinks reached the spawning streams. Surprisingly good seedings occurred in the Kitimat, Kildala, and Kitkiata rivers. The chum salmon escapement was fair, the heaviest seedings occurring in Kynoch Inlet, Poison Cove, and Bottleneck Creek in Higgins Pass.

*Bella Bella Area*

Supplies of sockeye were light; in general somewhat below the level of the brood year. Decreases were most notable in the Koeve, East Tuno and Kisemete rivers. There was a light seeding of coho generally over the area, the largest supplies appearing in Koeve River and the Gullchuck streams. Due again, in part, to extra conservation measures, a medium seeding of pinks occurred over



the area; although light to medium supplies reached some of the streams, there was a heavy escapement to others. The run to Koeve River was disappointingly small. The supply of chums was satisfactory to all streams. A noteworthy feature was the heavy early migration to Roscoe Inlet during August.

#### *Bella Coola Area*

The supply of sockeye was fairly satisfactory. Moderate supplies were observed in Kimsquit Lake, the main spawning grounds of the Kimsquit River system. A medium to heavy seeding took place in the Bella Coola-Atnarko system. The main spawning area between Lonesome and Tenas lakes was well covered with parent sockeye. Although the early migration of coho was light, the late run was large enough to assure a medium seeding. The supply of springs was satisfactory. Parent pinks were observed in the streams in medium numbers. There was an excellent run of chums in all streams.

#### *Rivers Inlet Area*

As usual, two inspections of the spawning grounds in the Owekano Lake area were carried out, the first between September 9 and 13 and the second between October 15 and 24. Good supplies of sockeye were found on all spawning areas. It was difficult to determine which streams received the best seeding. They were all well seeded but the best showing might have been at the Quap, Genesee, and Dallec, and probably the Shumahaul. The showing at Whannock was good. The Indian and Waukwash were also good but spawning had finished when these streams were reinspected during October. The Askum was good but spawning was not of great intensity during October. The runs were composed chiefly of large sized fish. "Runts" were not numerous. The following remarks of the inspecting officer, concerning special conservation measures enforced during the sockeye fishing season are of interest: "The moving of the commercial fishing boundary during the last week of fishing operations had a most beneficial effect on the 1946 escapement, and when it is acknowledged that some 65,000 cases were taken commercially, coupled with a very good escapement, the sockeye season for Rivers Inlet can and should be considered good." The supplies of coho were poor. Pink seeding was generally light. The escapement of chums was very good to all streams. The department's inspecting officer was accompanied by a representative of the industry on the final trip of inspection over this area.

#### *Smiths Inlet Area*

The sockeye supplies are reported to have been very good. The Geluck and Delabah rivers, the principal spawning grounds of this variety, were well seeded. The outward movement of the commercial fishing boundary, during the last week of sockeye fishing, was a factor that contributed, in part, to conditions there. The seeding of coho was light in all streams. There was a fair escapement of pinks. Chum supplies were heavy over the area.

### FRASER RIVER WATERSHED

#### *Prince George Area*

There was a noteworthy increase in the number of sockeye appearing in the area. The estimated stock of 8,000 parent fish in 1938 increased to 42,000 in 1942, while in 1946 the number observed was approximately 311,000. Supplies in the Stuart Lake system were slightly greater than in the brood year. The large increase was in the Fraser-Francois system where approximately 300,000

fish spawned, compared with 40,000 in the brood year. Supplies of spring salmon were satisfactory. The showing in the streams tributary to the Fraser, east of Prince George, was better than during any recent year.

#### *Quesnel Area*

Approximately 75,000 sockeye were observed on the spawning grounds of the Chilcotin River system, compared with 25,000 in the brood year. In the Bowron system some 7,000 fish were counted, compared with 1,500 in the brood year. About 60 sockeye were observed in the Horsefly river, which is the main spawning area of the Quesnel Lake system. This river has been barren for several years in this cycle. No sockeye were reported in any other stream in the Quesnel system, with the exception of the Mitchell River, where one pair was observed spawning. The supply of spring salmon was average, there being a slight increase in the Chilcotin system, a slight decrease in the Bowron River, while runs to other streams were similar to those of the brood year.

#### *Kamloops Area*

The early runs of sockeye to Raft River, tributary to the North Thompson, and Seymour River, tributary to Shuswap Lake, were considerably larger than in the brood years. The late run to Adams River, although possibly slightly less in numbers than that of the brood year, was very heavy. There was an increase in the spring salmon supplies throughout the area. The run to Nicola River was the largest for a number of years. The run of cohoes to the area was also the best in recent years.

#### *Pemberton Area*

Upwards of 75,000 sockeye spawned in the Birkenhead River, a figure which compares very favourably with the spawning of the past several years. In addition, some 400 fish spawned in Anderson Lake, Seton Creek, and Portage Creek. The run of spring salmon to the area was above average, especially in Tyaughton Creek, Portage Creek, and Gates Creek. Supplies of cohoes were only fair. The runs to the Squamish River, in the lower part of the area, and to Gates Creek and Portage Creek, in the upper part, were fair, but the supply to Seton Creek was poor. Chum supplies in the Squamish River were good, but the other streams in How Sound received only a light seeding.

#### *Chilliwack Area*

The run to the Cultus Lake area, where approximately 33,000 fish were counted, was good. A small, early run of sockeye spawned in the outlets of the streams tributary to Chilliwack Lake. This run is becoming progressively smaller each year. Spring salmon supplies were fairly good. The seeding of coho was generally light over the area with the exception of the Chilliwack River where a medium run spawned early in the season. Approximately 700 coho were counted in the Cultus Lake area. There was a medium run of chums to the Vedder, Chilliwack, and Sweltzer Creek areas. There were no chum salmon observed in the Coquihalla River and the seeding in all other streams was exceptionally light.

#### *Harrison Area*

The seeding of Weaver and Steelhead creeks, tributary to Morris Creek, where upwards of 30,000 sockeye spawned, was good. There was also a better than average spawning in Harrison River Rapids. The seeding of other streams

tributary to Harrison Lake was light. Supplies of spring salmon were small. The coho seeding was disappointingly light. Chums appeared in satisfactory numbers in the Harrison and Chehalis rivers.

#### *Pitt Lake Area*

A normal run of sockeye spawned in the upper Pitt River and tributaries. Supplies of cohoes, pinks, and chums were light over the whole area.

#### *Lower Fraser Area*

The seeding of coho was very light in all streams. The number of fish of this variety frequenting the Serpentine and Nicomekl rivers was less than usual. Chums in fair numbers appeared in the Alouette and Coquitlam rivers, as well as Kanaka and Whonnock creeks, but the supply present in all other streams was small.

#### *North Vancouver Area*

There was a slight increase in the number of cohoes in Capilano and Seymour rivers as compared with the brood year. The seeding in Indian River and other streams in the area was very light. A medium run of chums occurred to Indian River but the supply in the other North Shore streams was only fair.

#### *Alert Bay Area*

The sockeye seeding of the Nimpkish River was satisfactory although not quite as heavy as in the brood year, 1942. Medium supplies, comparable with the brood year, appeared in Fullmore, McKenzie, Kleena-Kleene, Nahwitti, Kahweeken, and Keogh rivers, with McKenzie and Kahweeken showing an increase over 1942. The seeding of springs was very satisfactory in all the main streams. Coho supplies were generally light, somewhat less than in the brood year, exceptions being the heavy seeding of Nimpkish River and Coho Creek, and the medium escapement to Kleena-Kleene, Wakeman, Kingcome, and Adams rivers. Although the pink run was light, the streams were fairly well seeded. The main run, which appeared while most of the seine boats were in Area No. 17, was lightly exploited. Practically all chum salmon streams were well seeded, a very heavy escapement occurring to several of the more important streams.

#### *Quathiaski Area*

Sockeye seeding at Hayden Bay was average, comparable with that of the brood year. Phillips River was also well seeded, showing quite an improvement over 1942. Spring salmon in very satisfactory numbers appeared in Campbell, Salmon, and Phillips rivers, as well as in the streams at the head of Bute Inlet. The coho seeding over the area was much lighter than in the brood year. The pink supplies were surprisingly good, although somewhat less than in the brood year. A heavy chum salmon seeding occurred in practically all streams, a considerable improvement over the brood year.

#### *Comox Area*

The seeding of spring salmon in Puntledge River was the best in recent years. Coho supplies were generally light. The seeding of Courtenay and Oyster rivers, as well as the streams in Baynes Sound, was fairly satisfactory, but it was distinctly poor in the streams in the lower portion of the area. While the return of spawning pinks was very light, the number appearing on the spawning grounds increased over the brood years. Supplies of chum salmon over the area were very satisfactory, an improvement over the brood year, excepting Englishman's River, where the run was disappointingly small.



*Pender Harbour Area*

At Saginaw Creek, the sockeye seeding, although an improvement over the brood year, was light. The supplies of springs were normal. The return of parent coho was the lightest in the past five years, although very similar to that of the brood year of 1943. The pink salmon seeding was also very light. There was a medium supply of chum salmon over the area.

*Nanaimo-Ladysmith Area*

Coho supplies were the lightest in the past five years. Pinks do not frequent this area in commercial quantities; however, this year some 2,000 parent fish spawned in the Nanaimo River. The chum salmon seeding was the best in recent years, especially so in the Chemainus River where the escapement was heavy and of long duration.

*Cowichan Area*

The supply of spring salmon was average. The number of parent fish passing Skutz Falls was estimated as between 12 and 15 thousand. The return of coho was the lightest for some years, estimated in numbers to be about 25 per cent of the brood year of 1943. Chum supplies were the heaviest in recent years. The steelhead run is being well maintained.

*Victoria Area*

The coho seeding was light. In the Sooke Basin area the chum seeding was heavy in Sooke River and smaller streams, as well as at Goldstream; an improvement over the brood year. In the streams lying west of Sooke Harbour spawning was light. Only the late run fish entered these streams due to low water conditions in the early fall.

*Alberni Area*

The seeding of sockeye in the Somass system, including the Sproat and Great Central Lake areas, was satisfactory. Good supplies, fully equal to the brood year, also appeared at Anderson Lake and Hobarton Lake in the Nitinat area. Supplies of spring salmon were very good in the Somass, Nahmint, Sarita, and Toquart rivers. The spawning run of coho up Somass River was heavier than that of the brood year. The actual count of fish over Stamp Falls was 11,734 coho, compared with 9,643 in 1943. In the other streams of the area, including Nitinat and Port Renfrew, the seeding was light to medium, and generally below expectations. Chum supplies were satisfactory in all streams, although the escapement was not quite as large as in the brood year.

*Clayoquot Area*

In the Kennedy Lake system the sockeye seeding was heavy, comparable to the brood year, and heavier than in 1945. At Megin Lake spawning was heavier than in the brood year but lighter than in 1945. Spring salmon supplies were the best in the past six years; an unusually high percentage of very large fish were present. The coho seeding was the lightest in recent years. On the other hand, the seeding of chums was the heaviest in some years.

*Nootka Area*

Spring salmon supplies in the Gold and Burman rivers were somewhat lighter than normal. The usual small numbers of coho were present; the streams of this area have never been large producers of this variety. The seeding of chums, the heaviest in the past three years, was satisfactory, although slightly less in numbers than in the brood year.



*Kyuquot Area*

The number of parent coho was somewhat lighter than normal. The seeding of chums in practically all streams was found to be very satisfactory, somewhat better than in the brood year.

*Quatsino Area*

There was the usual small supply of sockeye on the grounds. Spring salmon supplies were average in Marble Creek which is the principal spawning ground as well as in other streams in the area, with the exception of Klashkish River, where a light spawning occurred. There was a medium seeding of coho over the area, not as good as last year, but a slight improvement over the brood year. The escapement of pinks was much heavier than during the brood year and is reported the best since 1936. The supply of chums was fairly satisfactory, better than in 1945 and comparable to that of the brood year.

## APPENDIX No. 2

**ANNUAL REPORT OF THE CHIEF SUPERVISOR OF FISHERIES  
(E. D. FRASER) EASTERN DIVISION, FOR 1946**

Total landings of commercial fish and shellfish made in the Division, which consists of the three Maritime Provinces, amounted to approximately 666,700,000 pounds, with a landed value of about \$30,500,000. This is an increase of something like 66,000,000 pounds in catch and \$2,500,000 in landed value.

The increase in catch, as well as the increase in landed value, can be partially attributed to the removal of wartime controls which resulted in prices becoming higher, with greater marketing fields available both to the fisherman and processors.

## THE COD FISHERY

Cod landings increased 10,826,500 pounds over 1945 total and in landed value of \$297,662. The greatest increase in the catch of cod can be found in that taken by Nova Scotia fishermen with increases also in New Brunswick as well as Prince Edward Island. The greater portion of cod were marketed fresh although considerable quantities were used in the production of canned chicken haddie and salted fish.

## THE LOBSTER FISHERY

The total quantity of lobsters landed was 35,807,800 pounds, with a value of \$10,758,600. This is an approximate increase in the catch of one and one-third million pounds over the last year, and an increase in the value of \$1,478,274. The greatest catch of lobsters was taken in the province of Nova Scotia with New Brunswick rating second and Prince Edward Island third.

## THE SARDINE FISHERY

The sardine fishery is confined to the Bay of Fundy section with the greatest catch being realized on the southern part of New Brunswick. Most of the catch is utilized in the production of canned sardines. The total catch of sardines taken in southern New Brunswick was 97,224,400 pounds, with 1,406,000 pounds taken in Nova Scotia. During 1945, approximately 47,000,000 pounds were taken.

## THE HADDOCK FISHERY

There was a total of 33,524,300 pounds of haddock caught. Of this total, 32,691,400 pounds were taken in Nova Scotia, 823,700 pounds in New Brunswick, and 9,200 pounds in Prince Edward Island. The greater portion of this catch was sold in a fresh state.

## OTHER FISHERIES

The other principal varieties of fish taken during the year were salmon, scallops, oysters, clams, pollock, halibut, mackerel, swordfish, hake and tuna.

*Nova Scotia*

Total landings for the province of Nova Scotia were 414,492,200 pounds valued at \$20,319,647. The catch was slightly less than for the year 1945. However, there was an increase in the value of \$1,164,176. Decrease in catch is principally due to a drop of about 6,000,000 pounds in mackerel landings.

Landings decreased somewhat in Cape Breton Island but were about on 1945 level in the eastern mainland, showing an increase in the western section. A summary of the catch, landed values as well as marketed value is to be noted below:

1946

Total quantity of all fish landed.....	414,492,200 lbs.
Total landed value .....	\$ 20,319,647
Total marketed value .....	35,099,045

	Catch	Landed Value	Marketed Value
	Lbs.	\$	\$
Cod.....	216,927,700	7,618,324	14,409,863
Lobster.....	18,669,500	6,177,435	8,080,156
Haddock.....	32,691,400	1,524,303	2,467,637
Herring.....	58,173,400	868,132	2,127,965
Pollock.....	24,789,700	441,935	1,327,483
Swordfish.....	2,775,700	981,391	1,146,926
Mackerel.....	18,768,800	670,150	991,643
Hake.....	15,806,900	321,308	981,511
Scallops.....	(gals.) 80,786	488,547	576,484

*New Brunswick*

The total landings for New Brunswick, including the commercial catch from the inland waters, amounted to 216,965,300 pounds, and the landed value was \$1,653,382 more than for 1945. The increase in value was due to an added catch of sardines and a higher market price for lobsters as well as other varieties.

The catch of the inland fisheries amounted to 896,300 pounds with a total value of \$61,737. This catch and value is slightly less than for the year 1945.

The following table shows total catch, landed and marketed values of all fish taken in New Brunswick.

1946

Total quantity of all fish landed.....	216,965,300 lbs.
Total landed value .....	\$ 7,188,924
Total marketed value .....	18,642,360

	Catch	Landed Value	Marketed Value
		\$	\$
Lobsters.....	9,135,800	2,584,508	5,530,864
Sardines.....	97,224,400	1,513,453	4,173,851
Cod.....	12,634,000	665,164	1,509,108
Herring.....	54,586,500	640,914	2,722,245
Smelts.....	2,835,500	389,794	587,195
Salmon.....	750,700	293,098	1,166,879
Clams.....	5,959,300	131,180	383,721
Oysters.....	5,096,800	183,398	309,624

*Prince Edward Island*

Landings for the Island province show an increase of approximately 4,000,000 pounds, with larger catches of cod, hake, oysters, and herring. Total catch was about 35,000,000 pounds valued at \$2,900,000 as landed.

The collection and raking of Irish moss by fishermen was expanded considerably. Some 10,000,000 pounds were harvested, valued at \$124,000. The increase in production amounted to 7,800,000 pounds.

A list of the provincial catch, landed value and marketed value is noted below:

1946

Total quantity of all fish landed.....	35,227,200 lbs.
Total landed value .....	\$ 2,962,391
Total marketed value .....	3,299,942

	Catch	Landed Value	Marketed Value
		\$	\$
Lobster.....	8,002,500	1,996,677	2,496,047
Cod.....	6,471,900	279,179	475,017
Hake.....	6,474,400	220,749	515,725
Mackerel.....	2,454,300	127,195	246,976
Herring.....	6,080,100	70,660	172,055
Smelts.....	1,233,400	122,101	181,913
Oysters.....	2,024,200	99,212	120,550
Irish Moss.....	10,008,200	124,330	182,531

## SPORT FISHING

*Nova Scotia*

Angling in Nova Scotia during 1946 was not, on the whole, up to the standard of other years. This was not necessarily due to scarcity of fish but, rather, due to unfavourable water conditions which can be attributed to a lack of precipitation, coupled with a prolonged drought period, which continued from midsummer to late fall. When rains did have the desired effect of raising the water level, and cooling off the lakes and streams, some fairly good catches were taken on such water areas as the Margaree, Medway and LaHave rivers. However, owing to the lateness of the season, the results did not measure up to the catch of previous years.

Deep sea angling was carried on by United States sportsmen, principally for tuna in the Wedgeport and Yarmouth areas, with fairly good results.

*New Brunswick*

Anglers' catch of salmon on the St. John and Miramichi rivers was larger than in either of the two preceding years, and fishing for 'black' salmon prior to May 24 was also satisfactory. Otherwise, however, angling conditions, in general, were adverse. Water conditions were unfavourable, as a result of a drought period which continued throughout the entire summer. Moreover, because of the drought condition woodlands were closed by the provincial authorities for long periods and trout fishermen, particularly, were thus shut off from angling waters, particularly the more isolated lakes and streams. An increased number of non-residents took part in fishing for 'black' salmon. In Charlotte County some angling for pollock was carried on by tourists, and some by local people as well.



*Prince Edward Island*

In Prince Edward Island the angling was confined to fishing for trout in the ponds or lakes and the smaller rivers. These waters have been quite productive in other years and if the trout anglers' catch in 1946 showed some reduction it was, nevertheless, larger per acre of water than anywhere else in the Maritime Provinces.

## FISHERIES PATROL SERVICE

*Nova Scotia.*—Patrol in District 1, Cape Breton Island, was carried out by one chartered boat during the lobster fishing season. Patrol was carried on by the P.B.A. *Halkett* in the eastern mainland, District 2, use being made of boat 666 as required. Two chartered boats were also used in the Straits section of this district. In the western section, District 3, two of the Department's boats, the *Gilbert* and the *Capelin* were employed with a chartered boat as required. Satisfactory results were obtained from these operations.

*New Brunswick.*—Service in the Bay of Fundy area was carried on by a new boat, the *Fundy Rover*, replacing the *Thresher*, and the *Gannet Rock II*. This service was satisfactory. On the east coast, five chartered boats were employed from May until the end of November.

A considerable amount of lobster gear used in illegal fishing was seized and destroyed by these boats.

*Prince Edward Island.*—Six boats were employed in all, five chartered and one, the *Capitol*, owned by the Department. These boats were actively engaged in dealing with illegal lobster fishing.

## FISHERIES PROTECTION SERVICE

The C.G.S. *Cygnus* was commissioned during September, after being completely overhauled, and proceeded to Prince Edward Island to assist the patrol boat service. Good results were obtained, particularly by the use of the speed launch 666, which worked from the ship, in stopping illegal fishing.

Following duty in the Gulf area, the ship proceeded to Western Nova Scotia for the opening of the lobster season on December 1 and was later stationed at Canso as mother ship for the fishing boats out of that port and the Isle Madame area.

## FISH INSPECTION

Inspection of dry salt fish continued throughout the year and, in general, was well handled by the staff. Some instances of unsatisfactory packing were uncovered and appropriate action taken with regard to them.

The inspection and grading of canned fish increased, largely as a result of the purchases of products in this class which were made to meet European relief needs. The staff of the Department's Atlantic Fish Inspection Laboratory carried on the work actively.

Comparatively little inspection of frozen fish for overseas delivery was required during the year since shipments of such fish on British Food Ministry account had been discontinued.

## ILLEGAL FISHING

Such illegal fishing as caused trouble was mainly for lobsters and two outbreaks of this offending occurred in the Gulf area, in the vicinity of the boundary line between Districts 7 and 8. Considerable gear was seized by the patrol service at these times, a number of boat seizures were made, and offenders prosecuted. Other violations were of a minor nature and were dealt with successfully by the officers.



## REDUCTION OF FISH WASTE AND COARSE FISH

As in the preceding year, 17 plants carried on reduction operations. The outputs of meal and oil found ready market at good prices.

## LOSS OF LIFE AND GEAR

Unhappily, 11 Nova Scotia fishermen and two from New Brunswick lost their lives during the year. They were all inshore fishermen and the deepsea vessels escaped without loss of any of their men.

There was no abnormal, extensive loss of fishing gear during 1946. There were losses, of course, as always happens in a year's fishing operations, but they were not above average level.

## FISHING FLEETS

While fishing is being continued by power vessels using baited trawls, there is a change being made also to craft using other trawl gear. Two new vessels of this latter type were added to the fleet at Lunenburg this year and three others at Halifax. Interest in this method of operation is growing.

## CONCLUSION

During the year the Eastern Division has been passing through a period of reorganization. Adjustments and rearrangements have occasionally created some temporary dislocations but the staff is to be commended for its satisfactory service. The continued harmonious relations between the staff generally and the senior divisional officers, and the personnel at departmental headquarters at Ottawa, is a cause for satisfaction.

## APPENDIX No. 3

**ANNUAL REPORT OF H. V. DEMPSEY, CHIEF INSPECTOR,  
CENTRAL DIVISION, WINNIPEG, FOR 1946-47**

The program of whitefish inspection in the Prairie Provinces, begun in 1944 under joint arrangements made by the federal authorities and the three provinces, continued to be a major activity during 1946-47. This project has as its goal the removal of certain difficulties in whitefish marketing, the most important single branch of the Prairie fisheries, and one that is concerned mainly in exportation to the United States.

Under this program, whitefish producing lakes are classified on the basis of surveys which determine their suitability as sources of market supply. In addition such further examination is provided as may be necessary of whitefish shipments sent out of any of the three provinces. The surveys and the original inspections are carried out by provincial officers working under the supervision of the Chief Inspector of the federal department.

During the period June 1, 1944, to December 31, 1946, a total of 257 whitefish lakes in the Prairie Provinces was surveyed and classified. This work alone entailed the examination of over 40,000 individual whitefish, weighing in all in excess of 125,000 pounds.

Following the requirement that all whitefish, produced from lakes which have not been approved, must undergo processing to assure proper quality, processing plants have been established in the three provinces for the purpose of dealing with fish from unapproved lakes. These plants are distributed as follows: Alberta 8, Saskatchewan 6, and Manitoba 5.

## DEPARTMENT OF FISHERIES

## Northwest Territories

Commercial fishing was again conducted at Great Slave Lake during the summer of 1946. A catch limit of 2,500,000 pounds of whitefish and trout was established and the total catch reported was as follows:

	Round Weight Lbs.	Dressed Weight Lbs.
Whitefish .....	896,766	758,847
Lake trout .....	1,377,242	1,147,211
Inconnu .....	113,032	96,505
Totals .....	2,387,040	2,002,563

The marketable poundage of fish resulting from the catch was made up as follows:

	Frozen Fillets Lbs.	Frozen Dressed Lbs.
Whitefish .....	462,442	38,000
Lake trout .....	473,482	300,000
Inconnu .....	28,725	50,000
Totals .....	964,649	388,000

The fishery employed 60 licensed fishermen operating from 22 boats. An estimated 50,000 yards of gill-net were used. In addition, a staff of over 100 was employed at the plant in handling and processing the catch. The plant was located at Gros Cap, some 50 miles east of Yellowknife and over 600 air miles due north of Edmonton, Alberta. The frozen fillets were taken by refrigerator barge to the railhead at Waterways, Alberta, via the Slave and Athabasca rivers and the Fort Smith Portage.

In July, 1946, the Department, in co-operation with the Fisheries Research Board, conducted a biological survey of Tathlina and Kakisa Lakes. These two large bodies of water lie some 50 miles west southwest of the west end of Great Slave Lake. The survey indicated that Tathlina Lake is, at present, not suited to commercial fishing. However, Kakisa Lake was found to contain a large population of marketable pickerel (*Stizostedion vitreum*) and a catch limit of 200,000 pounds of this species was established for the winter season of 1946-47.

## ANNUAL REPORT ON FISH CULTURE

By C. J. Atkinson, for Director of Fish Culture

Fish cultural operations in 1946 were carried on by the Department of Fisheries in Nova Scotia, New Brunswick and Prince Edward Island where the fisheries are entirely, or to a large extent, under federal administration. Thirteen main hatcheries, six rearing stations, six salmon retaining ponds and several egg collecting camps were operated with a total output from these establishments of 23,434,828, over 81 per cent of which was distributed in the fingerling and older stages. The output by species, hatcheries and provinces was:—

STATEMENT BY SPECIES OF THE FISH DISTRIBUTED DURING THE YEAR ENDED  
DECEMBER 31, 1946

Species	Fry	Advanced fry	Fingerlings	Yearlings and older	Total distribution
Salmo salar—Atlantic salmon .....	35,000	3,456,920	8,134,797	29,413	11,656,130
Salmo fario—Brown trout .....			42,430		42,430
Salmo irideus—Rainbow trout .....			17,777	8	17,785
Salmo salar sebago—Sebago salmon .....			109,000	35,176	144,176
Salvelinus fontinalis—Speckled trout .....	70,000	670,860	10,709,282	124,165	11,574,307
	105,000	4,127,780	19,013,286	188,762	23,434,828

HATCHERIES AND REARING STATIONS OPERATED, THEIR LOCATIONS, DATES ESTABLISHED, THE SPECIES AND THE NUMBERS OF EACH SPECIES DISTRIBUTED FROM EACH ESTABLISHMENT DURING 1946

Estab- lished	Hatchery	Location	Species	Fry	Advanced fry	Fingerlings					Year- lings and older	Total distri- bution by species	Total distri- bution by hatcheries
						No. 1	No. 2	No. 3	No. 4	No. 5			
1929	Antigonish	St. Andrews, N.S.	Atlantic salmon		45,000	460,000					16,120	505,000	3,556,740
1876	Bedford	Bedford, N.S.	Speckled trout		100,000	2,104,500	547,000	196,000	88,120			3,051,740	
1937	Cobequid	Collingwood, N.S.	Atlantic salmon			194,000		165,980				165,980	359,980
1938	Coldbrook (f)	Coldbrook, N.S.	Speckled trout		112,000	70,000	111,000	33,400	16,700			326,400	
1936	Grand Lake (f)	Wellington Station, N.S.	Speckled trout		222,500	243,000	20,430	22,000	10,000		5,180	497,380	823,780
			Brown trout					74,000	30,430			42,430	
			Atlantic salmon					158,000	73,420	5,400		147,420	189,850
1937	Kejimikujik (f)	New Grafton, N.S.	Speckled trout								31,833	31,833	
1912	Lindloff	St. Peters, N.S.	Atlantic salmon				76,450	12,540	82,640		39,965	39,965	275,198
1902	Margaree	Frizzleton, N.S.	Speckled trout	60,000		490,000	313,000	134,630	72,600			82,640	244,230
1935	Mersey River (f)	Liverpool, N.S.	Atlantic salmon	150,000		746,730	98,510			1,740		929,630	
1913	Middleton	Middleton, Annapolis County, N.S.	Speckled trout			1,040,000	275,000					941,980	1,771,610
			Atlantic salmon			702,000		60,200	141,500	45,000	4,533	1,425,000	
1933	Nictaux Falls (f)	Nictaux Falls, N.S.	Speckled trout			30,000		175,000	88,600			953,233	2,378,233
1929	Yarmouth	South Ohio, N.S.	Atlantic salmon	25,000				242,000				190,400	
1939	Charlo	River Charlo, N.B.	Speckled trout		53,340	282,790	16,630	96,000				88,600	279,000
1928	Florenceville	Florenceville, N.B.	Speckled trout		52,320	501,825	255,700	139,550	32,500			295,000	
			Atlantic salmon			900,000	45,200				28,995	974,195	940,770
1880	Grand Falls	Grand Falls, N.B.	Speckled trout			45,000	20,000	16,000				81,000	
1874	Miramichi	South Esk, N.B.	Atlantic salmon	10,000	15,000	624,000	105,000	93,500	32,000	8,000	24,598	887,098	1,942,293
1914	Saint John	Saint John, N.B.	Speckled trout		2,196,030	475,800	254,200	154,000				1,424,450	
			Atlantic salmon			39,670	30,300					664,000	2,068,450
			Rainbow trout		285,000	80,000						3,046,000	
1938	Cardigan (f)	Cardigan, P.E.I.	Speckled trout	70,000	200,000	1,296,500	935,500	28,000			418	69,970	3,115,970
1906	Kelly's Pond	Southport, P.E.I.	Speckled trout				76,000	206,000	112,310			430,040	
			Atlantic salmon		541,600						8	17,785	
			Speckled trout		60,000						3,343	31,343	
											30,270	2,606,622	3,085,790
												378,310	454,310
												541,600	
												132,860	674,460
				105,000	4,127,780	11,893,675	3,635,940	2,554,549	869,620	59,502	188,762	23,434,828	

(f) Rearing station.

The fry and fingerlings included in this distribution were from collections in the autumn of 1945 and the spring of 1946.





Nutritional experiments were continued with fingerlings and parent stock, principally speckled trout. Rations that proved least efficient in the past were discarded and some new ones tried. Owing to the difficulty in securing a continuous supply of the various ingredients desired, not as many experiments were conducted as usual. However, in the experiments with fingerlings, 23 tests were made and 12 diets used made up of 12 ingredients, and with parent stock 9 tests were made and 6 diets used made up of 5 ingredients. Some of the diets gave promising results from the standpoint of survival, growth, and cost of food to produce a pound of fish.

In continuation of the Charlotte County lakes experiment, a co-operative effort between the Fish Culture Branch and the Atlantic Biological Station of the Fisheries Research Board, creel censuses were taken in Bonaparte, Crecy, St. Patrick, and Gibson lakes. The last mentioned lake was stocked with 7,700 fingerlings and 770 yearling speckled trout and Crecy lake with 6,750 speckled trout fingerlings and 675 yearlings—all marked fish. Welch Lake was closed to all fishing until the opening of the trout fishing season for New Brunswick in 1948. The creel census returns of 1946 again indicated poor productivity with yields per acre varying from 0.61 to 1.46 pounds. The low production per acre in all 8 lakes as shown by the following summary confirms the need for determining means of improving the fertility or productive capacity for trout in these and other lakes of similar type in the Maritime Provinces.

Lakes	Census year	Yield per acre (pounds)
Limeburner .....	1942	0.4
	1943	0.1 (approximate)
Bonaparte .....	1942	1.1
	1946	0.61
Johnson .....	1941	0.9
	1942	0.1 (approximate)
Kerr .....	1941	0.4
	1942	0.2
	1945	0.17
St. Patrick .....	1943	0.7 (approximate)
	1944	0.98 (approximate)
	1946	0.76
Crecy .....	1943	2.0
	1946	1.46
Crecy and outlet pond .....	1944	1.93 (approximate)
Welch .....	1944	0.58
	1945	0.07
Gibson .....	1944	0.76 (approximate)

The work on the Charlotte County lakes was extended co-operatively to the following waters with results as given below.

Lakes	Census year	Catch by anglers per acre (pounds)
Black, N.B. ....	1946	0.4
Copper, N.S. ....	1945	1.0
	1946	1.1
Lower O'Law, N.S. ....	1945	0.7
	1946	0.5
Upper O'Law, N.S. ....	1945	0.1
	1946	0.1
Sutherland, N.S. ....	1945	3.8
	1946	2.1

Assistance was also given the Fisheries Research Board in their study of trout production in Prince Edward Island, Atlantic salmon in the Petitecodiac area, N.B., and in the Shubenacadie district, N.S.

Selective breeding of speckled trout was continued to develop such characteristics as increased vitality, high yield, rapid growth, early spawning, colouration and general appearance. Outstanding pairs at the different hatcheries are mated and their progeny segregated. The progeny of the pairs, in which survival is highest, is retained for brood stock and periodically selected so long as they are profitable egg producers. The average yield of the selected pairs and of the general groups is indicated in the reports of the respective hatcheries.

From Lake Utopia, Charlotte County, N.B., 37 adult small mouthed black bass were transferred to Layton Lake near Amherst, N.S., and 14 to Shaw Lake, Saint John County, N.B. A further shipment of smelt eggs collected in the Miramichi River and Lake Utopia, N.B., was supplied for distribution into Manito Lake, Saskatchewan. Smelt eggs were also planted in Wheaton and Mill Lakes, N.B. Through the courtesy of the Restigouche Riparian Association slightly over 2,000,000 Atlantic salmon eggs were secured from the Restigouche River and laid down in Charlo hatchery. Brown trout fingerlings were introduced into the Cornwallis River, N.S. A shipment of 1,000,000 speckled trout eyed eggs was sent to the Department of Agriculture, France. Haley Brook, tributary to the Tobique River, N.B. was metered to determine its suitability for the establishment of new rearing ponds. During the year, at the regular salmon ponds, 3,661 parent Atlantic salmon were impounded. The average yield of eggs per female was 7,606 and for the individual ponds: Morell, 6,817; New Mills, 4,396; Miramichi, 7,046; River Philip, 7,965; Sackville, 6,190 and Margaree, 10,537.

Superintendent J. P. Chiasson, of the Margaree salmon pond, was again assigned to observe the ascent of salmon at the Tusket River Power Development but due to high water in the Tusket, he was not required there until after June 18. Between June 28 and July 12, he tagged and released in the tailrace below the power house 29 salmon but none of these was recaptured in the traps installed in the two fishways. He found that the salmon move in the tailrace with the tide, go up in the cold water when the tide rises and down to salt water when the tide falls. None remains when the tide is out. One tagged salmon was recaptured 300 yards below the bridge at the end of the tailrace.

The Canadian National Railways, the Canadian Pacific Railway and the Dominion Atlantic Railway companies continued their generous assistance and co-operation by furnishing free transportation for shipments of game fish and game fish eggs with their attendants. The extent of this co-operation is indicated in the following summary:

Railway	Total mileage on trip passes	Number of passages	Mileage on baggage car permits			Number of cases or cans			Number of permits
			Full	Empty	Total	Full	Empty	Total	
C.N.R.....	3,851	38	2,288	2,130	4,418	299	267	566	40
C.P.R.....	3,046	40	1,600	1,695	3,295	373	373	746	42
D.A.R.....	664	4	332	332	664	8	8	16	4
	7,561	82	4,220	4,157	8,377	680	648	1,328	86

NOTE.—Number of passages refers to transportation one way—a return trip counting as two passages. Number of permits refers to one way passages for cases or cans.

Operations generally at each establishment are referred to in the accompanying reports of supervisors and superintendents. Owing to conditions brought about by and following the war and a limited appropriation, no major new construction was undertaken and repairs and replacements were confined to essentials. Collections, transfers and distributions are given to the nearest hundred in the summaries of operations at the respective establishments.

## MARITIME PROVINCES

*Senior District Supervisor of Fish Culture, James Catt*

A survey of the 1946 fish cultural operations of the Eastern Division indicates that they were far more satisfactory than had been expected. The shortage of staff for field work, other than hatchery operations, curtailed a programme of investigation. Trained hatchery help was not available to quite the required degree. Unforeseen difficulties in obtaining supplies and labour and their increased cost greatly handicapped construction and constituted a heavy drain on the appropriation for fish culture for the fiscal year. Construction work included extension of the rearing pond system at Yarmouth (circular ponds 56 feet in diameter) and the rebuilding of the large dam at River Philip salmon pond. The brine freezer in the new garage-cold storage plant at Lindloff was completed.

Whilst the salmon and trout ova laid down during the winter 1945-1946 were of rather indifferent quality in some cases, the condition of the fry resulting from the hatch was unexpectedly good and this condition was maintained throughout the fingerling stages in spite of the unusually prolonged drought which extended in some districts from early summer until late November.

The season's collection included live fish and eggs. In addition to the ova obtained from hatchery trout and salmon held in permanent ponds, an excellent collection of salmon ova was made in the Restigouche River through the co-operation of the Restigouche Riparian Association. Wild speckled trout eggs were obtained from McRae Lake, Cape Breton and Trout Brook, Charlotte County, N.B.

The collection of landlocked salmon eggs at Chamcook Lake was very poor. For an undetermined cause very few fish entered the spawning brook until the last part of November—about three weeks later than usual—when the closing of the collecting station prevented their capture. Earlier in the month the creation of an artificial spate failed to bring in the fish.

Collections of ova included those obtained from Variety "B" landlocked Lake Utopia smelt and from the anadromous smelt of the Miramichi. All the eggs obtained from the latter and part of those obtained from Variety "B" were expressed to Dr. D. S. Rawson for distribution in Manito Lake, Saskatchewan. The balance of Variety "B" stock was planted in the affluents to Bocabec (Wheaton) Lake and Mill Lake, Charlotte County, N.B. It is of interest to note that Variety "B" smelt spawn about 12 days earlier than Variety "C"; the latter in 1945 appeared in such diminished numbers as to cause apprehension as to the survival of the strain. It was therefore with some surprise that the largest run of Variety "C" ever recorded appeared on the spawning grounds in the latter part of May this year. In the meantime the spawning grounds had been seeded with Variety "B" ova.

Owing to the impossibility of obtaining suitable nets for installation at the mouth of Trout Brook, Lake Utopia, it became necessary to collect small mouthed black bass by angling. This method was effective and the captured parent fish were liberated in Lavton Lake, Cumberland County, N.S., and in Shaw Lake, St. John County, N.B. Other distributions included those covered by the usual operations of the Maritime hatcheries, the transfer of yearling speckled trout from Saint John to Kelly's Pond, P.E.I., from Antigonish to Round Pond (Smith Settlement), Halifax County, and from Yarmouth to Tait Lake, Queens County. New introductions of exotics were limited to the liberation of brown trout fingerlings into the Cornwallis River. These fish were hatched at Middleton and reared at Coldbrook.

More than 4,000,000 speckled trout eggs were planted in streams of the Kennebecasis watershed, Menzies brook, Charlotte County, N.B., and Greys Mills brook, Kings County, N.B.



Owing to a rather general failure on the part of the angling public to co-operate with the Department by making returns of numbers of fish captured, accuracy as to the results of stocking continues to be difficult to obtain. However, some dependable records have been secured from the staffs of the Administrative Branch, the Fisheries Research Board and the Fish Cultural Branch of the Department.

The attempt to establish a rainbow trout fishery in Big Salmon River, N.B., seems on a fair road to success. Specimens up to three-quarters of a pound, some captured and others observed, were found to have spread over many miles of water. Individuals when opened were found to contain rapidly developing milt and ova. Such fish would most likely spawn in the river in the spring of 1947.

The stocking of the Guysborough River, N.S., with brown trout from Bedford and Antigonish was concluded in 1934. The definite excellence of the results obtained was not established until August when both residual and anadromous strains of the species were captured and observed without capture. Howe Lake, Saint John, continued to produce large speckled trout—some of the two-year-old fish were more than two pounds in weight and the yearlings had exceeded one-half pound in early June. This lake was also stocked with Atlantic salmon fingerlings in 1945 in order to observe the growth made by hatchery stocks after planting. The results were phenomenal. By October 26 the parr had assumed their smolt dress and were too large to mesh in a smelt net ( $1\frac{3}{8}$ " extension mesh). One sample specimen, nine inches, was taken.

Small mouthed black bass were introduced into Big Meadow pond, Deer Island, N.B., in 1942 and Millers Pond, Grand Manan, in 1943. This season 148 bass averaging two pounds were taken in the latter. A large number of 5-inch to 6-inch fish have been observed in Big Meadow Pond. Whilst these are believed to be young bass they have not been definitely identified. Speckled trout up to three pounds two ounces resulting from the stocking of Leonards pond, Deer Island, were taken this year. The trout fishery on Grand Manan established entirely through the agency of the Saint John hatchery was not quite as good as in 1945; this was probably due to drought and high water temperatures. Good results from the stocking of Clear Lake, Charlotte County, with Atlantic salmon were reported by spring and early summer anglers when personally requested to supply information.

Stocked in 1942, Bunker Lake and lakes and ponds with which it is connected are now yielding numbers of small mouthed black bass. During one week in August, 22 were taken by fishermen. They ranged from five to fifteen and a half inches in length and up to three pounds in weight. Brief surveys of Crooked Creek and McFadder Lake, both in Albert County, N.B., were made by Dr. A. W. H. Needler and the writer. Rainbow trout appear in good supply in Crooked Creek and some captures of this species up to three pounds plus in weight were reported to have been taken in West River, which, together with Crooked Creek and North River, has a common estuary in Shepody River. McFadden's Lake continues to carry an abundant stock of speckled trout. Their average size this year is slightly larger than last year. Whether this is due to fertilization, a reduction in number, or both, has not yet been ascertained. The waters specified in the above are limited to those which have been investigated by the writer or to which his attention has been called.

To co-operate with salmon investigations of the Middle Pollett River, N.B., carried out by the Fisheries Research Board, the main stream was stocked with Atlantic salmon fingerlings in August, 1945. The resultant parr were in abundance throughout the spring and summer in this area. Dr. P. F. Elson, Mr. H. C. White and the supervisors of fish culture made periodic surveys by seine and observation. A sharp drop in the numbers recaptured and seen in October was noticed on the return of mergansers to the planted waters. This



and the advent of many migrating kingfishers is significant of a heavy parr mortality although migrations might to some extent account for the reduction in numbers of parr indicated in the fall survey.

The elimination of predator and competitor fish in Round Lake, Kings County, N.B., was entirely successful. Powdered cubé root was used for this purpose. Dense bottom vegetation in which the dying fish became entangled and there remained made accuracy in determining the numbers killed impossible. The lowest estimate exceeded 200,000 but the actual figures may have been several times as great. A temporary screen to prevent the re-entry of coarse fish into the lake was constructed and more permanent construction is now in hand. The co-operation of the Saint John branch of the New Brunswick Fish and Game Protective Association in bearing the very considerable cost of the project and the Department of Lands and Mines of the Province in the assistance of its officers is very much appreciated.

Investigations of the Nipisiguit and Big Salmon Rivers, N.B., were carried out with a view to submitting suggestions for improving the salmon angling in both streams and the coastal commercial fishery in the Bathurst area.

Very few reports on the results of fertilization of hatchery stocked waters have been received this year. The few that have come to hand do not indicate that any appreciable degree of success has yet been achieved.

In the fall and winter of 1945 and early this year there was a greatly increased number of requests from public bodies and associations for the expansion of fish cultural plants, particularly for rearing ponds. Most of the sites suggested by the applicants proved unsuitable. This necessitated further search by the Supervisors, which, although not yet completed included examinations of Haley Brook, tributary to the Tobique River, N.B., Little, Middle, Bass, Tetagouche and Papineau Rivers, near Bathurst, N.B., Barnes and Belliveau Cove Brook, Digby County, N.S., and Logging Creek and smaller streams, Shelburne County, N.S. In Cape Breton Island many streams were investigated. These include Baddeck, North, Indian, Barachois and Catalone rivers and their tributaries, Aconi Brook, Boularderie Island, all streams affluent to Mira Lake east of Marion Bridge, and all streams between Sydney and Louisburg.

Field operations included the examination of some lakes and streams in New Brunswick, Nova Scotia and Prince Edward Island.

In reviewing the general picture of fish cultural procedure for the season it is most gratifying to note the increased co-operation of the administrative branch, the directors of the Fisheries Research Board's Maritime stations and their staffs, various departments of the provincial governments, and branches of fish and game protective associations. In regard to the latter the Saint John branch, the largest branch of the New Brunswick Fish and Game Protective Association, with its considerable funds was outstanding in assistance given, not only in financing the Round Lake project but in actively participating in distributions. Mr. G. Costillo, Chairman of the Association's Fish Committee, arranged for trucks, cars, etc., to assist the hatchery transport, and he personally attended all but two of the distributions made in Saint John County, making many of them himself.

Public meetings at which fish cultural matters were discussed were attended at Fredericton, Saint John and St. Stephen, N.B., and at Halifax, Windsor and Greenfield, N.S.

#### *District Supervisor of Fish Culture, F. A. Tingley*

In January, February and March the following conferences or meetings were attended:—Supervisor Watson's at Kentville, Chief Supervisor Barry's at Halifax, Nova Scotia Fish and Game Protective Association, Halifax, and

Fisheries Research Board at St. Andrews. Other meetings and conferences attended during the year were:—The New Brunswick Guides' Association, Fredericton; West Hants Fish, Game and Forest Protective Association, Windsor; Supervisor F. E. Justason's, St. Stephen and Saint John; and a meeting at Greenfield regarding the Medway River fishery.

The writer assisted again in the collection of smelt eggs at Lake Utopia and transfers to Mill and Wheaton lakes. A shipment was made for the third consecutive season to Dr. D. S. Rawson for stocking Manito Lake in Saskatchewan. With the assistance of Mr. R. A. McKenzie, of the Fisheries Research staff, a shipment of sea-run smelt eggs was collected also in lower Miramichi tributaries for the same lake.

From May 7 to June 1 a collection of 38 small mouthed black bass was made in Lake Utopia and Trout Brook for further stocking of Layton Lake, near Amherst, N.S. One fish was lost, and the remaining 37 were released in good condition in the lake on June 3. The slight salinity found in the lake when the stocking of 1945 was made could not be detected. The Amherst branch of the Nova Scotia Fish and Game Protective Association is to be commended for the successful effort in excluding tidal water from the lake.

On July 18, 23 and 25 a total of 14 small mouthed black bass were captured in Lake Utopia and transferred to the Shaw Lake system near Saint John. This stocking was made to supplement the bass planted in these waters in 1944.

In late June a weir was installed in Haley Brook, a tributary of the Tobique River, to meter the water volume for proposed rearing ponds. In August the writer accompanied Supervisor Catt in a search for rearing pond sites in Cape Breton.

Returning from Cape Breton, an examination of Guysborough River was made in connection with rumors of a strange form of trout being taken in that stream. The presence of both residual and sea-running brown trout was established by capture of a dozen or more specimens. This population is the result of hatchery stocking, the most recent of which was made in 1934.

In collaboration with Dr. P. F. Elson, of the Fisheries Research staff, monthly checks were made of the survival and distribution of salmon parr in the Middle Pollett River. The parr were survivors of fingerlings planted in this section of the Pollett in 1945. The distribution proved to be widespread and specimens were found in satisfactory abundance up to August 20. In subsequent tests there was a marked decrease in the numbers captured, probably the result of predation by mergansers and of dispersal.

The writer participated also in the following operations during the season:—Nipisiguit River investigation and survey of suggested pond sites; investigation of Big Salmon River for results of rainbow trout stocking, and of the possibilities of re-establishing the run of salmon; construction of dam and elimination of fish population in Round Lake; collection of speckled trout ova at Trout Brook, Lake Utopia; collection of Sebago salmon ova at Chamcook Lakes and distribution by planting of surplus speckled trout ova from yearling parent stock at Saint John hatchery.

As equipment requisitioned for the Trout Brook ova collection was unobtainable, a small fyke net was made up at Saint John hatchery from material available. It was set on October 10 and kept in operation until November 22. A total of 95,490 speckled trout eggs was taken from 67 parent fish. Of this number 85,490 were laid down in Saint John hatchery and 10,000 were equally divided and planted in Trout and Spear's brooks. The number of trout captured was 104, of which 73 were females.

Fences and traps for capture of sebago salmon at Chamcook Lakes were installed October 29. The water was extremely low, and no fish entered the stream until November 9. Up to November 18 the total catch was 57 salmon,

of which only four were females. The traps were removed on this date owing to shortage of available funds in the fish culture allotment. After the camp was closed a considerable number of salmon was reported to have been observed in the stream. The lateness of the run can be ascribed to abnormally low water conditions that prevailed generally. Four thousand eggs were obtained and laid down in Saint John hatchery. Twenty-two of the salmon captured, i.e., 38.6 per cent, had been marked by removal of the adipose and left ventral fins.

Inspections of Grand Falls and Florenceville hatcheries were made in June. Yarmouth, Middleton and Bedford hatcheries and Grand Lake rearing ponds were inspected in December.

#### *District Supervisor of Fish Culture, A. P. Hills*

Meetings attended during the year included Supervisor Watson's conference, Chief Supervisor Barry's conference, the annual meeting of the Nova Scotia Fish and Game Protective Association, Supervisor Justason's meetings at St. Stephen and Saint John, and a meeting at Greenfield regarding Medway River.

During the month of March the writer supervised the packing and shipping of two lots of speckled trout eggs to France. In the early spring an attempt was made to locate a suitable hull for a launch to be used at New Mills pond, N.B.

Inspections of establishments during the year included Bedford, Grand Lake, Middleton, Nictaux, Stevens, Yarmouth, Mersey, Kejimikujik, Antigonish, Cobequid, River Philip, Miramichi, Charlo, New Mills, Grand Falls, Florenceville, Lindloff, Margaree, Kelly's, Cardigan and Coldbrook. Eight of the places were visited twice. While at Campbellton, N.B., the services of a census taker at Black Lake were arranged for, and members of the Loch Lomond Fishing Club in that district were interviewed.

Assistance with the collection of black bass at Lake Utopia was given, and further observations and tests at Simpson's pond, Kentville, were carried out in June and September.

Weirs were constructed and arrangements made for volume and temperature readings at Barnes and Belliveau Cove brooks in Digby County, N.S., and at Logging Creek in Shelburne County, N.S.

Waters examined and reported on during the year included Douglas Mill pond in Prince Edward Island; Dewars (Angevine), Vickery, Moose or Riversdale, "A" Lake, Twin and Crick Lakes and Fort Point Lily pond in Nova Scotia. A preliminary check-up was made in tributaries of Sherbrooke (Nine Mile) Lake with regard to results of stocking with four strains of rainbow trout in 1944. The writer also assisted at Round Lake near Saint John after elimination of the fish population in that lake, and with checks on the dispersal of salmon fingerlings in the Pollett River near Petiteodiac, netted Howe Lake, Saint John, and rendered some assistance in the investigation of Big Salmon River, Nipisiguit, Middle, Little and Tetagouche Rivers, also assisted in the planting of surplus green speckled trout eggs from Saint John hatchery.

#### ANTIGONISH HATCHERY

##### *W. D. Turnbull, Superintendent*

The hatchery ponds between October 26 and November 27 produced 15,190,100 speckled trout eggs which were laid down in Antigonish hatchery. This collection which exceeds that of last year by over 3,300,000 was supplemented by receipt in February and March of 500,000 Atlantic salmon eyed eggs from Kelly's Pond hatchery and 250,000 same species from Miramichi. Speckled trout eyed eggs were transferred during the same months to the following hatcheries: Middleton 1,500,000, Yarmouth 750,000, Bedford 1,250,000, Cobequid 1,000,000, Grand Falls, 1,250,000, Kelly's 500,000 and Miramichi



100,000. One million were also shipped to the Department of Agriculture, France. Forty thousand speckled trout fingerlings were sent to the Grand Lake rearing station between October 1 and November 7. Distributions for the year were 505,000 Atlantic salmon and 3,051,700 speckled trout, of which 500 of the latter species were marked by fin clipping and distributed by Doctor Beatty in Round Pond in the Musquodoboit area. Thirty trout, two years of age, were placed at the disposal of Doctor Black, Dalhousie University, in August, in connection with his research work on this species. In selective breeding 10 pairs of 2-year-old trout averaged 2,624 eggs per female as against 1,427 in the general group of the same age; likewise, 29 pairs of 3-year-old trout averaged 3,080 eggs per female as against 1,746 in the general group. Good fishing has been reported from all areas served by this hatchery. Valuable assistance was rendered, especially in distributing adult trout, by the fisheries inspectors, the Antigonish Fish and Game Association, and the Chief Forest Ranger.

#### BEDFORD HATCHERY AND SACKVILLE RIVER SALMON-RETAINING POND

*George Heatley, Superintendent*

Receipt of eggs in March amounted to 1,250,000 speckled trout from Antigonish and 250,000 Atlantic salmon from Miramichi, and, in November, 1,145,200 Atlantic salmon from Sackville Pond. In May and June shipments of young fish to the rearing stations were made, 380,000 speckled trout to Coldbrook and 248,400 Atlantic salmon to Grand Lake. Twenty thousand Atlantic salmon eggs were retained for Dalhousie University as required. Distributions direct from Bedford for the year were 166,000 Atlantic salmon and 194,000 speckled trout. Transfers and distributions to and from Grand Lake and Coldbrook rearing stations were made by the Bedford hatchery staff and truck, as well as movement of equipment to and from River Philip in connection with repair work there. A general increase on the spawning grounds is reported for Atlantic salmon and a general improvement in nearly all waters stocked. The fullest co-operation was received from fisheries supervisors and fish and game associations.

At the Sackville River Pond between September 15th and October 18th 325 Atlantic salmon averaging five pounds in weight were taken, of which 185 females were stripped November 4 to 15, yielding 1,145,200 eggs for Bedford hatchery. Low water conditions prevailed during the collection period. Two hundred and fifty-four salmon kelts were marked with tags of the series K3743-K3998 and liberated, 88 in Beaver Bank River, 91 in Long Lake (Kinsac) and 75 in Rawdon River. Thirty-six salmon also were transferred to Grand Lake ponds for use of Doctor Black, Dalhousie University, in his research work on this species.

#### COBEQUID HATCHERY AND RIVER PHILIP SALMON-RETAINING POND

*P. B. Stratton, Superintendent*

From November 1 to December 17th 662,300 speckled trout eggs were collected from the hatchery ponds. This collection was augmented by receipt of 1,000,000 eggs of the same species from Antigonish in March and 1,624,900 Atlantic salmon from River Philip in November. Distributions from Cobequid for the season were 497,400 speckled trout and 326,400 Atlantic salmon. In selective breeding 20 pairs of yearling trout averaged 752 eggs per female as against 370 in the general group of the same age. A further attempt was made to transfer undersized trout from Byers Lake to less productive waters in the adjacent locality. The results of trapping these fish, however, were not as successful as had been anticipated. Of 36 taken September 19 to October 22,



twenty-one were transferred to Irving Lake. A curb wall pond was built giving greater water capacity than the usual saucer type. The fish and game associations and fisheries supervisors showed willingness to assist when called upon. Assistance and salmon stock were given in connection with experimental plantings to tributaries of the Pollett River. A female salmon bearing tag number K3579 was recaptured on rod and line in River Philip on April 26, weighing 12 pounds. It had been tagged at River Philip in October, 1943, at which time it weighed  $6\frac{1}{2}$  pounds. Some gratifying reports have been received on the results of stocking. One of these concerns Carters Lake near Truro which received small trout fingerlings in 1945. It is reported that these have done exceedingly well. A chute was installed at the water supply dam to facilitate loading ice, and repairs were made to ponds, buildings, and equipment as needed.

Considerable repairs had to be made to the dam at River Philip salmon-retaining pond and before they were finished quite a number of salmon had ascended the river. However, 277 were taken, averaging 10 pounds, between October 25 and November 27. From 204 females stripped November 13 to 27th, 1,624,900 eggs were secured and laid down in Cobequid hatchery.

#### COLDBROOK REARING PONDS

*E. Barrett, Superintendent*

After opening on May 1 repairs to the water supply dam were completed and the usual work of relining the ponds with gravel, disinfecting with HTH and connecting the water supply was carried on in preparation for receipt from Bedford between May 24 and June 3 of 380,000 speckled trout advanced fry and fingerlings, and from Middleton May 25 to 27 of 45,700 brown trout fingerlings. With the assistance of the Bedford and Middleton staffs and trucks 147,400 speckled trout and 42,400 brown trout were distributed. Close co-operation was given by the fisheries officers of the district. Members of the Kings County Fish and Game Association offered their services at distribution time. Favourable reports were received regarding trout fishing from waters stocked from this establishment.

#### GRAND LAKE REARING PONDS

*W. H. Cameron, Superintendent*

Bedford hatchery in June supplied 248,400 Atlantic salmon, and Antigonish in October and November 40,000 speckled trout fingerlings. Operations at Rawdon River and Waverley Run in October and November resulted in a catch of 33 sebago salmon averaging  $1\frac{1}{2}$  pounds in weight, 14 of which were females yielding 17,800 eggs. Of the 33 caught in the traps, six, or 18 per cent, bore the Grand Lake Pond mark. In addition, anglers reported 191 marked sebagos during the year from Grand Lake and 260 from Lake William. Out of 1,416 sebagos caught in Grand Lake, Lake William, and Long or Bennery Lake, 457 or 32 per cent were marked fish. The 33 above mentioned were this year tagged with the series K4946-4981 and liberated, 11 in each of Grand Lake, Beaverbank River, and Kinsac (Long) Lake. At the hatchery ponds 348 sebago females in November yielded 124,100 eggs. Distributions for the season were 40,000 speckled trout, 203,400 Atlantic salmon, and 31,800 sebago salmon, of which 31,715 were marked by fin clipping. The marked sebagos were planted 29,680 in Grand Lake, 1,800 in Grants Brook, and 235 in Rawdon River. Two thousand and thirty-five sebago salmon, one-year-old fish, were distributed for Doctor A. G. Huntsman in Rawdon River and Grant Brook, and 18 six and seven years old were forwarded to Bedford hatchery for the use of Doctor E. C. Black. The eggs obtained from the three-year-old sebago salmon, first

generation of pond stock, were better than any previous eggs taken from the ponds. The resultant fry and fingerlings were strong and healthy and carried through the summer with small loss. The ponds were repaired and several blow holes above the dam closed with excelsior, clay and crushed rock dust. Encouraging reports were received from waters stocked with speckled trout. Assistance was given by the fisheries inspector in making distributions.

#### KEJIMKUJIK REARING PONDS

*T. K. Lydon, Superintendent*

In May 300,000 speckled trout and, in July, 100,000 Atlantic salmon fingerlings were received from Middleton hatchery. From these 161,600 trout and 82,600 salmon were distributed. Trout were reported plentiful in the district, but, due to abnormal water conditions, the catch was small. Assistance in connection with the distributions was given by the North Queens and Lunenburg branches of the Fish and Game Association.

#### LINDLOFF HATCHERY

*W. T. Owens, Superintendent*

Speckled trout egg collections in October and November amounted to 2,402,200 from the hatchery ponds and 118,600 from McRae Lake. No salmon eggs were received in 1946 but those laid down in the fall of 1945 produced a distribution of 929,600. The speckled trout distribution for the season amounted to 842,000. Nine hundred and fifty-eight speckled trout were transferred from McRae Lake to Lindloff Lake. In selective breeding 16 pairs of 3-year-old speckled trout yielded 2,596 eggs per female as against 1,380 per female in the general group of the same age. Approximately 2,000 speckled trout were caught by anglers during the season in Lindloff Lake. Excellent fishing was reported from Blackett, Dutch Brook, Mary Ann's, Thompson and Grand Lakes. The brine freezer in the new building constructed in 1945 was completed, water pipe installed thereto, and the grounds improved generally.

#### MARGAREE HATCHERY

*J. W. Heatley, Superintendent*

The hatchery ponds produced 1,965,700 speckled trout eggs October 21 to November 20, which collection was supplemented by receipt of 4,088,250 Atlantic salmon eggs in November and December from Margaree salmon pond. Distributions for the season were 1,425,000 Atlantic salmon and 953,200 speckled trout. In selective breeding 40 pairs of 3-year-old speckled trout yielded 2,050 eggs per female as against 1,168 in the general group of the same age. Good trout angling was reported in Lake O'Law, Margaree, Glenora Falls and North River districts, and good salmon angling after the early fall rains had raised the water levels. The best of co-operation was received from the fishery supervisor and his officers. Dams were completed in the series "A" ponds, four long troughs replaced by eight short ones, and wire covers made for several of the fry ponds.

#### MARGAREE SALMON-RETAINING POND

*J. P. Chiasson, Superintendent*

In accordance with the usual practice, the salmon for this pond were purchased from the Margaree Harbour Salmon Fisheries Association. Preparations began August 1 and consisted of repairing the towing pontoons and installing the trap gates. The net was fished continuously from October 1 to November 8,

taking 560 salmon averaging 10.3 pounds. From 388 females, stripped November 19 to December 2, eggs totalling 4,088,250 were taken and allotted to Margaree hatchery.

### MERSEY RIVER REARING PONDS

*C. E. Harding, Officer-in-Charge*

Between May 20 and June 14th 100,000 speckled trout fingerlings and 200,000 Atlantic salmon advanced fry and fingerlings were received, the former from Middleton and the latter from Yarmouth hatchery. The output for the season was 190,400 salmon and 88,600 trout. Some repairs were made to pockets of the upper ponds in order to stop leakages, and minor repairs to screens and equipment as needed. Considerable assistance was rendered during distributions by local sportsmen, members of the fish and game association, and staff of the Nova Scotia Power Commission. Greater numbers of speckled trout were observed in most waters of the district.

### MIDDLETON HATCHERY, STEVENS PONDS AND NICTAUX REARING STATION

*F. M. Millett, Superintendent*

Eggs received during the year were;—in February, 50,000 brown trout from the Department of Lands and Forests, Fish and Wildlife Division, Ontario, via their Brantford hatchery; in March, 1,500,000 speckled trout from Antigonish, and in November, 1,000,000 of the same species from Saint John. In June, Stevens Ponds received 505,400 Atlantic salmon and 116,400 speckled trout fingerlings from Nictaux. Outgoing shipments of young fish April to July consisted of 968,200 Atlantic salmon and 200,000 speckled trout to Nictaux, 300,000 speckled trout and 100,000 Atlantic salmon to Kejimikujik, 100,000 speckled trout to Mersey, and 45,700 brown trout to Coldbrook. Distributions for the season were 319,000 speckled trout and 205,000 Atlantic salmon. Four new rearing tanks were placed in the hatchery and minor repairs and alterations made to the hatchery buildings. Very good trout fishing was experienced in the district with a much better run of salmon in the Nictaux and Annapolis rivers than the previous year. Evidence was secured that rainbow trout planted in Rumsey Lake in 1944 had established themselves and were supplying excellent fishing. Considerable assistance and co-operation were received from the fish and game associations and fisheries supervisors.

Nictaux rearing station received 968,200 Atlantic salmon fry April 20-22 and 200,000 speckled trout advanced fry May 15 from Middleton. The eggs were incubated and fry reared until June 11-29 when 505,400 salmon and 116,400 trout were transferred to Stevens ponds and the balance, 25,000 salmon, distributed in the Nictaux River. The old barrier to facilitate keeping the screen on the intake pipe clean was washed away by a freshet and was replaced by a new one.

### YARMOUTH HATCHERY

*F. F. Annis, Superintendent*

The hatchery ponds November 8—December 5 produced 70,120 speckled trout eggs. Additional eggs received were in March 750,000 speckled trout from Antigonish and 250,000 Atlantic salmon from Miramichi, and in November 500,000 speckled trout from Saint John hatchery. In June 200,000 Atlantic salmon advanced fry and fingerlings were supplied to Mersey rearing station. Distributions from Yarmouth amounted to 156,000 Atlantic salmon and 540,160 speckled trout, of which 362 trout yearlings were marked by removal of the adipose and left pectoral fins and distributed in Tait Lake. Two trout marked in 1945 were recaptured June 2, 1946, and had attained excellent growth,



being 10 inches long and 255 grams in weight. Dam No. 3 in the brook was enlarged and raised to provide water for two new circular ponds which were completed on the lower lot. Minor repairs were made to the long ponds and screens installed at the intake end of the supply pipe. Valuable assistance was received from the Shelburne County Fish and Game Association, fisheries supervisors and inspectors, and the operator of the Birchdale Camps, in giving information and helping us with the distributions.

#### CHARLO HATCHERY

*R. O. Barrett, Superintendent*

Stripping operations at the hatchery ponds October 28–November 11 yielded 650,500 speckled trout eggs, and at the Restigouche River, October 25–31, where facilities for this work were extended by the courtesy of the Restigouche Riparian Association, 2,009,300 Atlantic salmon eggs. These collections were supplemented by receipt of 707,000 Atlantic salmon eggs in October and November from New Mills salmon pond. Distributions for the season were 949,400 Atlantic salmon and 375 speckled trout. In selective breeding 20 pairs of speckled trout two years old yielded 2,047 eggs per female as against 1,689 per female in the general group of the same age. Salmon fishing in the Restigouche River and tributaries has improved considerably during the past few years. The Dalhousie Fish and Game Association gave valuable assistance during the distribution of trout in their district. A new stable, 28 feet by 17½ feet with 10 foot posts, was built and covered with cedar shingles.

#### FLORENCEVILLE HATCHERY

*J. M. Butler, Superintendent*

The hatchery ponds, October 15–November 9, produced 1,560,100 speckled trout eggs. Receipt of eggs from other sources were, in March, 250,000 Atlantic salmon from Miramichi hatchery, and, in November, 500,200 same species from Miramichi salmon pond. In May 100,000 speckled trout advanced fry were sent to Grand Falls hatchery. In July, 170 Atlantic salmon yearlings were forwarded to Saint John hatchery for use of the Fisheries Research Board. Distributions for the year were 887,100 speckled trout, 974,200 Atlantic salmon and 81,000 sebago salmon. In selective breeding 10 pairs of four- and five-year-old speckled trout yielded 1,665 eggs per female as against 1,055 in the general group of the same age. Reports from the Southwest Miramichi River indicate a decided increase in the number of Atlantic salmon on the spawning grounds. Fishing has also improved in Skiff Lake and Cold stream. Twenty-four new pond shades were built and minor repairs made to equipment, screens and troughs. Splendid co-operation, including help with the distributions, was received from the Fredericton and McAdam branches of the Fish and Game Association and from the district supervisor, fisheries inspector, and many game and fish wardens and guides.

#### GRAND FALLS HATCHERY

*W. A. McCluskey, Superintendent*

In March 1,250,000 speckled trout eggs were received from Antigonish and 1,000,000 Atlantic salmon from Miramichi; in May 100,000 speckled trout fry from Florenceville; and in November 631,800 Atlantic salmon from Miramichi salmon pond and 2,536,000 speckled trout eggs from Saint John hatchery. Distributions for the season were 1,424,500 Atlantic salmon and 664,000 speckled trout. Salmon and trout were reported quite plentiful on the spawning grounds. The Madawaska branch of the Fish and Game Association gave splendid assistance in making distributions. Seven wood ponds were renewed.



## MIRAMICHI HATCHERY AND SALMON-RETAINING POND

*Frank Burgess, Superintendent*

In March 100,000 speckled trout eggs were received from Antigonish hatchery and in October and November 5,010,700 Atlantic salmon from the Miramichi salmon pond. Outgoing shipments of Atlantic salmon eyed eggs in March were 100,000 to the State Fish hatchery, Fort Edward, New York, 100,000 to the Department of Lands and Forests, Fish and Wildlife Division, Picton, Ontario, 250,000 to Florenceville, 1,000,000 to Grand Falls, 250,000 to Antigonish, 500,000 to Saint John, 250,000 to Yarmouth, and 250,000 to Bedford hatchery. Distributions for the season amounted to 3,046,000 Atlantic salmon and 70,000 speckled trout. Approximately the same number of Atlantic salmon were reported on the spawning grounds this year as last. Drift net, commercial and fly fishing were good the first part of the season, but low water later reduced the catch. Some low land on the hatchery property was filled in, seeded down and improved.

The parent salmon in the Miramichi pond were purchased as usual by tender and contract, and from September 9 to October 16th, 1,748 fish averaging 8.3 pounds in weight were impounded. Between October 23 and November 16th, 886 females were stripped, yielding 6,242,700 eggs, which were allotted 5,010,700 to Miramichi, 631,800 to Grand Falls, 500,200 to Florenceville, and 100,000 by plane to the State of New York Conservation Department, Albany, New York.

## NEW MILLS SALMON-RETAINING POND

*William White, Superintendent*

Between June 3 and July 9th, 319 salmon averaging 10½ pounds were purchased from 12 commercial fishing stands of the district, delivered and impounded at the New Mills pond. At spawning time, October 28—November 5th, 131 females yielded 707,000 eggs which were all laid down for incubation in the Charlo hatchery. Only nine salmon were lost during their retention period in the pond from June to November.

## SAINT JOHN HATCHERY

*K. G. Shillington, Superintendent*

The hatchery ponds produced in October and November 16,249,400 speckled trout eggs. Of these 4,790,200 were planted as green eggs in streams of the Kennebecasis watershed, Menzies Brook, Charlotte County, and Greys Mills Brook, Kings County, N.B. One million were shipped to Middleton, 2,536,000 to Grand Falls, 500,000 to Yarmouth, and the balance 7,423,200 laid down for incubation in Saint John hatchery.

The ponds also produced 44,600 rainbow trout eggs in April and May. Besides the collections from the ponds, the following eggs were received: 500,000 Atlantic salmon from Miramichi in March, 4,000 sebago salmon from Chamecook Lakes and 85,500 speckled trout from Lake Utopia in November. In June 1,013 speckled trout yearlings were sent Kelly's Pond hatchery. Distributions for the season were 430,000 Atlantic salmon, 31,300 sebago salmon, 2,606,600 speckled trout and 17,800 rainbow trout. Three thousand, two hundred and eighty-two of the sebago one-year-olds, 38,095 speckled trout fingerlings to one year old, and 3,014 Atlantic salmon fingerlings were marked by fin clipping before being planted—all sebagos in Chamecook Lake, all Atlantic salmon in Big Salmon River, and the speckled trout in the following lakes: 21,450 in Balls, 8,470 in Gibson, 750 in Walton, and 7,425 in Crecy. In selective breeding 9 pairs of speckled trout, two years old, yielded 2,480 eggs per female as against 1,509 per female in the general group of the same age and 17 pairs three years old yielded 3,732 per female in the selected group as against 2,301 in general group. Excellent co-operation was given by the different branches of the Fish and Game Association. They liberated most of the fingerlings in the following districts:

Moncton, Sussex, Minto, McAdam, Fredericton Junction, St. Stephen and Saint John. The Saint John branch liberated the fish in the Saint John district including the old fish during the fall. The Fisheries Supervisor at Black's Harbour also gave valuable assistance in making distributions. The Fisheries Research Board were supplied with 390 one year old and 1,100 Atlantic salmon No. 3 fingerlings. Rainbow trout the result of hatchery plantings have been caught in Big Salmon River. More speckled trout have been taken in Loch Lomond than for a number of years. Twelve large troughs were constructed and set up to replace old ones.

Operations at Chamcook Lakes were carried on with the assistance of the District Supervisors of Fish Culture and under their general supervision. At Chamcook between November 9 and 18 fifty-seven sebago salmon were taken, four females of which yielded 4,000 eggs. Of the 57 seabagos taken, 22, or 38.6 per cent, bore the hatchery markings. All eggs taken were transferred to Saint John hatchery for incubation. Water in the lakes this season was abnormally low.

### CARDIGAN REARING PONDS

*C. Sayer, Superintendent*

Between May 16 and 27 Kelly's Pond hatchery supplied 459,000 speckled trout and 150,000 Atlantic salmon advanced fry or fingerlings from which 378,300 trout and 76,000 salmon fingerlings were later distributed. Good angling was reported in the district. Flat River, Cardigan River, Whitlock's Pond, Big Brook and Big Pond are a few waters that have shown improvement. Co-operation was received from the Charlottetown branch of the Fish and Game Association. Dead trees were removed from the grounds and along the pipe line. A hoisting beam was installed in the storeroom, equipment repaired and grounds improved generally.

### KELLY'S POND HATCHERY AND MORELL RIVER SALMON-RETAINING POND

*C. A. Tait, Superintendent*

A collection of 284,400 speckled trout eggs was made from the hatchery supply pond November 4-22. Other eggs received were 500,000 speckled trout from Antigonish hatchery in February and 1,411,100 Atlantic salmon from Morell Pond in November. One thousand and thirteen speckled trout yearlings were received from Saint John hatchery in June. Outgoing shipments were in February, 500,000 Atlantic salmon eggs to Antigonish and in May 459,000 speckled trout and 150,000 Atlantic salmon advanced fry and fingerlings to Cardigan rearing station. Distributions for the season were 541,600 Atlantic salmon and 132,900 speckled trout. The dam and spillway of the supply pond were repaired, consisting of a new deck, replanking of spillway and flume, and renewal of several timbers in the cribwork of the dam. Very good angling was reported from many parts of the district, especially of sea run trout. The hatchery staff assisted the Fisheries Research Board during the summer, and a dam for experimental work was constructed at Simpson's Pond.

Assistant C. H. Cooper was in charge of the salmon retaining pond at the Morell River where 432 salmon averaging eight pounds in weight were impounded between October 18 and November 20. From 207 females stripped, November 5-23, a yield of 1,411,100 eggs was secured for Kelly's Pond hatchery.

### *Receipts and Shipments Generally*

The receipt of 50,000 brown trout eggs from the Ontario Department of Lands and Forests, Fish and Wildlife Division, is gratefully acknowledged. Outgoing shipments of Atlantic salmon eggs consisted of 200,000 to the Conservation Department, State of New York, Albany, N.Y., 100,000 to the Ontario Department above mentioned, and 1,000,000 speckled trout eggs to the Department of Agriculture, Paris, France.

## STATEMENT BY SPECIES OF LOCAL COLLECTION AND DISPOSAL OF EGGS DURING 1946

Species	Collection area	Eggs collected	Number collected	Disposal—Establishment at	Eggs received	Number	Totals
Atlantic salmon.	Margaree pond, N.S.	Nov. 19-Dec. 2.	4,088,250	Margaree.	Nov. 20-Dec. 3.	4,088,250	
	River Philip, N.S.	Nov. 13-27	1,624,850	Cobequid	Nov. 14-29	1,624,850	
	Sackville River, N.S.	Nov. 4-15	1,145,200	Bedford	Nov. 4-15	1,145,200	
	Miramichi pond, N.B.	Oct. 23-Nov. 16.	6,242,720	Florenceville. Grand Falls. Miramichi. State of New York. Conservation Dept.	Nov. 6. Nov. 2. Oct. 24-Nov. 16.	500,200 631,800 5,010,720	
Rainbow trout.	New Mills pond, N.B.	Oct. 28-Nov. 5.	706,930	Charlo.	Oct. 31.	100,000	
	Restigouche River, N.B.	Oct. 25-31	2,009,280	Charlo.	Oct. 29-Nov. 7.	706,930	
	Morell River, P.E.I.	Nov. 5-23	1,411,100	Kelly's pond.	Oct. 25, Nov. 1.	2,009,280	
	Saint John hatchery ponds, N.B.	Apr. 18-May 4.	44,610	Saint John.	Nov. 5-23	1,411,100	17,228,330
Sebago salmon.	Grand Lake, N.S.	Nov. 8-22	17,800	Grand Lake.	Apr. 18-May 4.	44,610	44,610
	Grand Lake rearing ponds, N.S.	Nov. 4-22	124,100	Grand Lake.	Nov. 8-22	17,800	
	Chamcook Lakes, N.B.	Nov. 14, 18.	4,000	Grand Lake.	Nov. 4-22	124,100	
	Antigonish hatchery ponds, N.S.	Oct. 26-Nov. 26.	13,167,780	Saint John.	Nov. 14, 18.	4,000	145,900
Speckled trout.	Cobequid hatchery ponds, N.S.	Nov. 15-27.	(a) 2,022,300	Antigonish.	Oct. 26-Nov. 27.	15,190,080	
	Lindloff hatchery ponds, N.S.	Nov. 1-Dec. 17.	(a) 662,290	Cobequid.	Nov. 1-Dec. 17.	662,290	
	Lindloff hatchery ponds, N.S.	Oct. 28-Nov. 15.	2,101,220	Lindloff.	Oct. 28-Nov. 28.	2,402,180	
	McRae Lake, Richmond County, N.S.	Nov. 11-28.	(a) 300,960	Lindloff.	Oct. 11-19.	118,610	
	Margaree hatchery ponds, N.S.	Oct. 11-19.	118,610	Margaree.	Oct. 21-Nov. 20.	1,965,690	
	Yarmouth hatchery ponds, N.S.	Oct. 21-Nov. 20.	1,965,690	Yarmouth.	Nov. 8-Dec. 5.	70,120	
	Charlo hatchery ponds, N.B.	Nov. 8-Dec. 5.	(a) 70,120	Charlo.	Oct. 28-Nov. 11.	650,530	
	Florenceville hatchery ponds, N.B.	Oct. 28-Nov. 11.	650,530	Florenceville.	Oct. 15-Nov. 9.	1,560,100	
	Saint John hatchery ponds, N.B.	Oct. 15-Nov. 9.	1,560,100	Midleton.	Nov. 7.	1,000,000	
	Saint John hatchery ponds, N.B.	Oct. 22-Nov. 13.	9,849,800	Yarmouth.	Nov. 6.	500,000	
	Saint John hatchery ponds, N.B.	Oct. 21-Nov. 22.	(a) 6,399,570	Grand Falls.	Nov. 10, 13.	2,536,000	
	Trout brook, Charlotte County, N.B.	Oct. 24-Nov. 22.	95,490	Saint John.	Oct. 21-Nov. 22.	12,213,370	
Speckled trout.	Trout brook, Charlotte County, N.B.	Oct. 24-Nov. 22.	95,490	Saint John.	Oct. 24-Nov. 14.	85,490	
	Southport (Kelly's Pond) hatchery pond, P.E.I.	Nov. 4-22.	284,400	Trout brook. Spear's brook.	Oct. 24-Nov. 22.	5,000 5,000	
				Kelly's pond.	Nov. 4-22.	284,400	39,248,870
							56,667,710

(a) from yearling fish.



## DEPARTMENT OF FISHERIES

IN THE INTEREST OF ECONOMY AND CONVENIENCE IN DISTRIBUTION THE FOLLOWING TRANSFERS WERE MADE IN 1946

Species	From	To	Eyed eggs		Fry		Fingerlings	
			Number	Date received	Number	Date received	Number	Date received
Atlantic salmon.....	Bedford.....	Grand Lake					248,400	June 18-24
	Middleton.....	Kejmkujik.....					100,000	July 5, 6, 8
	Nictaux.....	Middleton.....			998,200	Apr. 20-22		
	Yarmouth.....	Mersey.....			50,000	June 7	505,400	June 25-29
	Miramichi.....	Antigonish.....	250,000	Mar. 7			150,000	June 11-14
	Miramichi.....	Bedford.....	250,000	Mar. 20				
	Miramichi.....	Yarmouth.....	250,000	Mar. 27				
	Miramichi.....	Florenceville.....	250,000	Mar. 9				
	Miramichi.....	Grand Falls.....	1,000,000	Mar. 9				
	Miramichi.....	Saint John.....	500,000	Mar. 26				
	Kelly's Pond.....	Antigonish.....	500,000	Feb. 27				
	Middleton.....	Cardigan.....			150,000	May 20-27		
	Middleton.....	Coldbrook.....					45,660	May 25, 27
	Antigonish.....	Bedford.....	1,250,000	Mar. 1				
Brown trout..... Speckled trout.....	Antigonish.....	Cobequid.....	1,000,000	Mar. 14				
	Antigonish.....	Grand Lake.....					40,000	Oct. 1-Nov. 7
	Antigonish.....	Middleton.....	1,500,000	Mar. 8				
	Antigonish.....	Yarmouth.....	750,000	Mar. 29				
	Antigonish.....	Grand Falls.....	1,250,000	Mar. 23				
	Antigonish.....	Miramichi.....	100,000	Mar. 1				
	Antigonish.....	Kelly's Pond.....	500,000	Feb. 28				
	Bedford.....	Coldbrook.....			140,000	May 24, 25	240,000	May 27-June 3
	Middleton.....	Kejmkujik.....					300,000	May 25-30
	Middleton.....	Mersey.....					100,000	May 20-24
	Nictaux.....	Nictaux.....			200,000	May 15	116,400	June 11
	Middleton.....	Middleton.....			100,000	May 28-29	171,000	May 20-27
	Florenceville.....	Grand Falls.....			288,000	May 16-18		
	Kelly's Pond.....	Cardigan.....						



## EGGS, FRY, FINGERLINGS AND OLDER FISH ON HAND, END OF CALENDAR YEAR 1946

Establishment	Species	Eggs	Fry	Fingerlings	1 year	2 year	3 year	4 year	5 year and older	Total by species	Total by hatchery
Antigonish.....	Speckled trout.....	14,473,000		16,175	9,050	3,465	600			14,502,290	14,502,290
Bedford.....	Atlantic salmon.....	1,126,450								1,126,450	1,126,450
Cobequid.....	Atlantic salmon.....	1,581,650								1,581,650	
	Speckled trout.....	647,250		42,338	4,966					694,554	2,276,204
Grand Lake.....	Atlantic salmon.....			5,010						5,010	
	Sebago salmon.....	107,000		39,329	1,870	1,012	422	108	25	149,766	
	Speckled trout.....			39,955						39,955	194,731
Lindlof.....	Speckled trout.....	2,172,850		735	1,034	2,549	345			2,247,513	2,247,513
Margaree.....	Atlantic salmon.....	4,000,700	70,000							4,000,700	
	Speckled trout.....	1,772,500		12,242	4,418	2,568	1,102			1,792,830	5,793,530
Middleton.....	Speckled trout.....	708,900								708,900	
Yarmouth.....	Speckled trout.....	429,700		3,073	244					433,017	433,017
Charlo.....	Atlantic salmon.....	2,479,500								2,479,500	
	Speckled trout.....	424,130		2,045		213			197	426,585	2,906,085
Florenceville.....	Atlantic salmon.....	486,190								486,190	
	Sebago salmon.....			14,315						14,315	
	Speckled trout.....	1,533,580		22,068	4,637	2,360	1,817	421	178	1,565,081	2,065,566
Grand Falls.....	Atlantic salmon.....	614,540								614,540	
	Speckled trout.....	1,690,420								1,690,420	2,304,960
Miramichi.....	Atlantic salmon.....	4,844,760								4,844,760	
Saint John.....	Atlantic salmon.....			1,206	1,666				1	2,873	
	Rainbow trout.....			500	190				16	706	
	Sebago salmon.....	3,800								3,800	
	Speckled trout.....	6,824,260		11,077	1,961					6,838,160	6,918,577
	Atlantic salmon.....	1,266,800		17,000	6,400	500				1,280,700	
	Speckled trout.....	225,660								225,660	14,825,530
Kelly's Pond.....	Speckled trout.....										
		47,463,710	70,000	227,068	36,436	12,667	4,286	529	417	47,805,113	47,805,113

## KEY TO ABBREVIATIONS

*Species*

- A. Atlantic salmon.  
 B. Brown trout.  
 R. Rainbow trout.  
 L. Landlocked or Sebago salmon.  
 S. Speckled trout.

*Stages of Development.*

- a. Green eggs.  
 b. Eyed eggs.

- c. Fry.  
 d. Advanced fry.  
 1. No. 1 Fingerlings.  
 2. No. 2 Fingerlings.  
 3. No. 3 Fingerlings.  
 4. No. 4 Fingerlings.  
 5. No. 5 Fingerlings.  
 f. Yearlings.  
 g. Two years.  
 h. Three years.  
 k. Older fish.

## DISTRIBUTIONS

Advanced fry: Fish for a period of two weeks following the complete absorption of the yolk sac.

## Fingerlings:

- No. 1 From two to eight weeks after complete absorption of the yolk sac.  
 No. 2 From eight to fourteen weeks after complete absorption of the yolk sac.  
 No. 3 From fourteen to twenty weeks after complete absorption of the yolk sac.  
 No. 4 From twenty to twenty-six weeks after complete absorption of the yolk sac.  
 No. 5 From twenty-six weeks to one year from date of hatch.

## NOVA SCOTIA

## ANTIGONISH HATCHERY

*Antigonish County—*

- Afton River—35,000 S1.  
 Beaver Meadow River—30,000 S1, 25,000 S2, 6,000 S4.  
 Big brook—South River—30,000 S1, 5,000 S2, 5,000 S3, 6,000 S4.  
 Black River—30,000 S1, 25,000 S2, 2,500 S4.  
 Brierly brook—30,000 S1.  
 Cameron Lake—West River—15,000 S1.  
 Carl Lake—5,000 S3.  
 Delhanty Lake—30,000 S1.  
 Gaspereaux Lake—30,000 S1, 1,000 S4, 2,540 Sh.  
 Glenroy River—40,000 Sd, 10,000 S2, 5,000 S3, 5,000 S4.  
 James River—35,000 A1.  
 Linwood Lake—20,000 S1.  
 MacDonald Lake—5,000 S2, 900 Sf, 300 Sg.  
 MacGillivray Lake—South River—470 Sh.  
 Maryvale or Malignant brook—30,000 S1.  
 McMillan Lake—10,000 S1, 1,000 Sh.  
 Meadow Green River—80,000 S1, 2,500 S4.  
 Middleton Lake—30,000 S1.  
 North Lake—50,000 S1.  
 North River—10,000 S1.  
 Pinevale brook—15,000 Sd.  
 Pinevale Lake—25,000 Sd, 5,000 S2, 1,000 Sh.  
 Polson brook—South River—40,000 S1, 1,000 S4.  
 Rights River—15,000 Ad.  
 St. Joseph Lake—15,000 S1, 13,000 S2, 600 Sf.  
 South River—35,000 A1, 102,500 S1, 15,000 S2, 12,620 S4, 1,200 Sf.  
 South Lake—40,000 S1.

- Springfield brook—Glenroy River—20,000 Sd, 5,000 S4.  
 West River—90,000 S1, 25,000 S2, 5,000 S3, 16,000 S4, 2,000 Sf.

*Guysborough County—*

- Black Lake—12,000 S3.  
 Canter Lake—30,000 S1, 7,500 S3.  
 Cocee Coffre Lake—30,000 S1, 15,000 S2, 12,000 S3, 1,200 Sf.  
 Country Harbour River—20,000 Ad.  
 Cudahys Lake—20,000 S2, 6,000 S3.  
 Dobson Lake—75,000 S1, 18,000 S2, 12,000 S3.  
 Donahue Lake—70,000 S1, 20,000 S2, 7,500 S3.  
 Dunphy Lake—5,000 S3.  
 Ecumsecum River—45,000 S1, 12,000 S3.  
 Eight Island Lake—40,000 S1.  
 Fitzgerald Lake—20,000 S2, 6,000 S3.  
 Gavin Lake—10,000 S3.  
 Giant Lake—70,000 S1, 20,000 S2, 9,000 S4.  
 Goldboro or Goldbrook Lake—21,000 S2.  
 Goshen Lake—20,000 S1.  
 Goose Harbour Lake—6,000 S3.  
 Guysborough River—35,000 S1.  
 Hazel Hill Lake—45,000 S1.  
 Hydro dam, Havre Bouche River—40,000 S1, 15,000 S2.  
 Indian Harbour Lake—28,000 S2.  
 Jellow Lake—75,000 S1, 25,000 S2.  
 Kennedy Lake—30,000 S1.  
 Lawlor Lake—15,000 S2.  
 Long Lake—Salmon River—2,000 S4.  
 MacIntosh Lake—5,000 S4.  
 Mannassette Lake—50,000 S1.  
 Mason Lake—10,000 S3.

*Guysborough County—Con.*

McInnis (Joe's) Lake—20,000 S1, 5,000 S2, 2,500 S4.  
 McPherson Lake (Port Shoreham)—60,000 S1.  
 Morrison Lake—47,000 S1.  
 Narrow Lake—45,000 S1, 5,000 S2.  
 Porter River—40,000 S1, 10,000 S2.  
 Pringle Lake—10,000 S2, 2,500 S4, 1,000 Sh.  
 East River St. Mary—130,000 A1.  
 West River St. Mary—140,000 A1.  
 Salmon River—30,000 A1, 40,000 S1, 10,000 S2.  
 Seal Harbour Lake—27,000 S2.  
 Shepherd Lake—15,000 S2.  
 Sherbrooke Lake—55,000 S1, 10,000 S2, 600 Sf.  
 Square Lake—Salmon River—5,000 S4.  
 Sullivan Lake—35,000 S1, 5,000 S2, 2,500 S4.  
 Taylor Lake—East River St. Mary—20,000 S2.  
 Three Mile Lake—45,000 S1.  
 Tracadie River—10,000 Ad.  
 Two-Mile Lake—East River St. Mary—25,000 S1, 2,000 S4, 600 Sf, 500 Sh.

*Halifax County—*

Round Pond (Smith Settlement)—500 Sf.

*Pictou County—*

Barney River—25,000 A1, 30,000 S1.  
 Bezanson Lake—600 Sf.  
 Big brook—East River—5,000 S3.  
 Blue Mountain dam, French River—5,000 S2.  
 Brora Lake—25,000 S2.  
 Calder Lake—15,000 S2.  
 Campbell Lake—French River—20,000 S2.  
 East River—35,000 A1, 80,000 S1, 17,000 S3.  
 French River—15,000 A1.  
 French River branch (French River Settlement)—20,000 S1.  
 Lansdowne Lake—12,000 S3.  
 Little Caribou River—6,000 S3.  
 McLellan brook—40,000 S1.  
 McPherson Lake—20,000 S2.  
 Middle River—15,000 A1.  
 River John—750 Sf.  
 Sixmile brook—6,000 S3.  
 Sutherland River—30,000 S1.  
 West branch brook—East River—20,000 S1, 12,000 S3.  
 West River—70,000 S1, 12,000 S3, 360 Sh.

## BEDFORD HATCHERY

*Colchester County—*

Carter brook—Stewiacke River—16,000 S1.

*Halifax County—*

Halfway brook—Sheet Harbour—18,000 S1.  
 Ingram River—20,000 A3.  
 Lewis Lake—East River—20,000 S1.  
 Little Salmon River—Cole Harbour—20,000 A3.  
 Little Sheldrake Lake—20,000 S1.  
 Maxwell Lake—Sackville River—20,000 S1.  
 Musquodoboit River—20,000 A3.  
 Ninemile River—20,000 A3.  
 Otter Lake—Tangier River—20,000 S1.

Quillan Lake—20,000 S1.  
 Rocky Brook Lake—West River Sheet Harbour—20,000 S1.  
 Sackville River—5,980 A3.  
 Salmon River (Port Dufferin)—20,000 A3.

*Hants County—*

Bog brook—Coxcomb or Cockscorn Lake—20,000 S1.  
 Lily Lake—Meander River—20,000 S1.

*Lunenburg County—*

East River—20,000 A3.  
 Gold River—20,000 A3.  
 Middle River—20,000 A3.

## COBEQUID HATCHERY

*Albert County—*

Pollett River—48,000 A2.

*Colchester County—*

Bass River, at Five Islands—12,000 S1.  
 Chiganois River—30,000 Sd, 15,000 S1, 2,600 S4.  
 Debert River—30,000 Sd.  
 East River, at Five Islands—10,000 S1.  
 Economy Lake—3,600 S4.  
 Economy River—20,000 A1.  
 Folly River—10,000 A1.  
 Gamble Lake—8,000 S1.  
 Irving Lake—2,500 S3, 400 Sf.  
 Juniper Pond—1,000 S4.  
 Long Lake—French River—2,250 S3.  
 North River, near Truro—20,000 A1, 15,000 A2.  
 Portapique River—18,000 Ad.  
 Rocky Lake—French River—400 Sf.

Salmon River—20,000 A1, 12,000 A2.  
 Shatter Lake—2,250 S3, 400 Sf.  
 Silica Lake or Bass River Lake—4,000 S1.  
 Simpson Lake—12,000 Sd, 580 Sf.  
 Waughts River—15,000 Sd.

*Cumberland County—*

Amherst Pond (Reservoir)—Nappan River—5,000 S1.  
 Angevine Lake—2,000 Sf.  
 Barbour Lake—2,000 S1, 400 Sf.  
 Black Lake—9,000 A2, 6,000 A3.  
 Black River—7,000 Sd.  
 Cumberland Railway Reservoir (Springhill)—Maccan River—2,000 Sd.  
 Dead Lake—3,000 S1.  
 Doherty brook—3,000 S1.  
 Fountain Lake—10,000 S1.  
 Isaac Lake—6,000 Sd.  
 Leak Lake—3,000 S1, 500 Sf.

*Cumberland County—*

Little Lake—Newfound Lake—1,500 Sd.  
 Maccan River—20,000 Ad, 15,000 A2, 6,400 A3, 30,000 Sd, 3,000 S4.  
 Maccan River, south branch—15,000 S1, 3,000 S3.  
 McAloney Lake—5,000 S1.  
 Moose River—16,000 S1.  
 Mountain brook—4,000 S1.  
 Newfound Lake—6,000 Sd.  
 Parrsboro Aboiteau—5,000 S1, 500 Sf.  
 Pugwash River—12,000 Sd.  
 Ramshead River—11,000 S1.  
 River Philip—20,000 Ad, 12,000 A2, 3,000 A3.  
 River Philip, east branch—10,000 Sd.  
 River Philip, west branch—10,000 Sd.  
 Shinimikas River—18,000 Ad, 21,000 Sd.  
 Shulie River—3,500 S4.  
 Springhill Lake—2,500 S1.  
 Tidnish River—12,000 S1.

Vickery Lake—3,000 S1.  
 Wallace River—20,000 Ad, 18,000 A3, 30,000 Sd, 18,000 S1, 3,000 S4.  
 Webb Lake—1,500 S1.  
 Welton Lake—6,000 S1.

*Pictou County—*

River John—35,000 S1.

*Westmorland County—*

Calhoun brook—Silver Lake or Morice Pond—6,000 S1.  
 Carter brook—Westcock creek—3,000 S1.  
 Fawcett brook—Silver Lake or Morice Pond—2,000 S1.  
 Gaspereau River—16,000 Ad.  
 Jenks brook—Tantramar River—3,000 S1.  
 North brook—Musquash Lake—4,000 S1.  
 Robinson brook—Tantramar River—8,000 S1.  
 Walt Spence brook—8,000 S1.

## COLDBROOK PONDS

*Kings County—*

Annapolis River—11,000 S3.  
 Armstrong Lake—10,000 S3.  
 Aylesford Lake—7,000 S4.  
 Brandywind brook—Cornwallis River—5,500 B3, 5,000 B4.  
 Cambridge brook—Cornwallis River—7,000 B3, 3,000 B4.  
 Canard River—5,000 S4.  
 Cornwallis River—9,500 B3, 10,000 B4.

Crooked Lake—5,000 S4.  
 Habitant River—3,420 S4.  
 Lake George—10,000 S3, 13,000 S4.  
 Lake Paul—10,000 S4.  
 Lake Torment—15,000 S4.  
 Murphy Lake—10,000 S3, 10,000 S4.  
 North River—15,000 S3.  
 Pereaue brook—3,000 S3.  
 Trout River—5,000 S3, 5,000 S4.  
 Tupper brook—Cornwallis River—2,430 B4.  
 Upper Sixty Lake—10,000 S3.

## GRAND LAKE PONDS

Fisheries Experimental Station, Halifax,  
 Nova Scotia—18 Lk.

*Colchester County—*

Northwest Lake—Stewiacke River—1,000 Sf.  
 Stewiacke River—22,000 A3.

*Halifax County—*

Albro Lake—1,000 Sf.  
 Byron Lake—2,000 Sf.  
 Chezzetcook River—22,000 A3.  
 Cole Harbour Lake—500 Sf.  
 Conrod Lake—Chezzetcook River—2,000 Sf.  
 First Pond—Ketch Harbour—1,000 Sf.  
 Five Island Lake—Hosier River—2,000 Sf.  
 Fraser Lake—Ninemile River—1,000 Sf.  
 Goose Lake—Porter Lake—1,500 Sf.  
 Halfmile Lake—1,000 Sf.  
 Lake Major—Little Salmon River—2,000 Sf.  
 Little West River Lake—Sheet Harbour—2,000 Sf.  
 McGrath Lake—2,000 Sf.  
 Meisner Lake—1,000 Sf.  
 Perry Lake—Lake Thomas—1,000 Sf.  
 Pockwock Lake—1,000 Sf.  
 Pratt Lake—1,065 Sf.  
 Ragged Lake—Prospect run—2,000 Sf.

Rawdon River—20,000 A3, 235 Lf.  
 Russell Lake—500 Sf.  
 Sackville River—30,000 A3, 5,400 A5.  
 Salmon River—Echo Lake—22,000 A3.  
 Sandy Lake—Marsh Lake—1,000 Sf.  
 Sheehan Lake—2,000 Sf.  
 Ship Harbour River—22,000 A3.  
 Shubenacadie (Grand) Lake—28,450 Lf, 475 Lg, 565 Lh, 290 Lk.  
 Spider Lake—900 Sf.  
 Stillwater Lake—East River—2,000 Sf.  
 Tangier River—20,000 A3.  
 Upper Petpeswick, Long Bridge or Bridge End Lake—2,000 Sf.  
 West River Sheet Harbour—20,000 A3.  
 Williams Lake (North West Arm)—2,000 Sf.

*Hants County—*

Grant brook—Ninemile River—1,800 Lf.  
 Kennetcook River—20,000 A3.  
 Lewis Lake—1,000 Sf.  
 Noel Lake—500 Sf.

*Lunenburg County—*

Hollahan Lake—1,000 Sf.  
 Mill Cove Lake—1,000 Sf.  
 Spondo Lake—1,000 Sf.



## KEJIMKUJIK PONDS

Lahave River and tributaries—27,660 A4.  
 Cook Lake—1,320 S4.  
 Park pond—490 S4.  
 Wiles Lake—1,980 S4.

Medway River and tributaries—54,980 A4.  
 At Delongs Settlement—7,060 S2.  
 Cameron Lake—4,700 S2.  
 Charlotte Lake—3,140 S2, 220 S4.  
 Christopher brook—1,100 S4.  
 First Christopher Lake—780 S2.  
 Dolliver Lake (near Kempt)—500 S4.  
 Freeman Lake—1,180 S2.  
 Harmony Lake—4,700 S2, 990 S4.  
 Malaga or Maligeak Lake—9,480 S4.  
 McGowan Lake—7,060 S2, 3,300 S4.  
 Pleasant River—10,650 S4.  
 Scott Lake—3,300 S4.  
 Tupper Lake—4,400 S4.

Whiteburn brook—990 S4.  
 Wild Cat River—6,380 S4.

## Mersey River—

Grafton River—990 S4.  
 Grafton Lake—5,880 S2, 1,890 S4.  
 Hunt Lake—410 S4.  
 Kejimkujik Lake—17,840 S2, 6,420 S4.  
 Little River—10,000 S2.  
 Minard brook—2,800 S4.  
 Minard Lake—4,700 S2, 2,480 S4.  
 Upper Mersey River—9,410 S2, 6,500 S4.  
 Westward or West River—12,540 S3.

## Petite River—

Crouse Lake-Hebb Lake—910 S4.  
 Fancy Lake—2,950 S4.  
 Newcombe Lake—1,650 S4.  
 Oakhill Lake—500 S4.

## LINDLOFF HATCHERY

*Cape Breton County—*

Belfry Lake—30,000 S1.  
 Blackett Lake—16,000 S1.  
 Canoe Lake—12,000 S1.  
 Catalogne Lake—20,000 S2.  
 Chain or String Lakes-Mira River—12,000 S1.  
 Cochran Lake—12,000 S1.  
 Dutch Brook Lake—10,000 S1.  
 Gabarus Lake—20,000 S1.  
 Gaspereaux River—60,000 A1, 70,000 A2, 29,630 A3.  
 Gillies Lake-East Bay—20,000 S1.  
 Grand Lake, near Louisburg—12,000 S2.  
 Hardy Lake—12,000 S1.  
 Loon Lake-Mira Bay—12,000 S1.  
 McCormick Lake—12,000 S1.  
 Meadow brook-Sydney River—25,000 S1.  
 Mulleuish Lake—20,000 S1.  
 Salmon River—45,000 A1, 140,000 A2, 35,000 A3.  
 Stewart Lake—12,000 S2.

*Inverness County—*

Brawley Lake—20,000 S1.  
 Horton Lake—20,000 S1.  
 McIntyre Lake (Grantville)—16,730 S1, 13,270 S2.  
 Pleasant Hill Lake—10,000 S1.

*Richmond County—*

Black River—20,000 S1.  
 Breen Lake—15,000 S1.

Buchanan Lake—15,000 S1.  
 Falls Bay brook—5,000 S1.  
 Ferguson brook—8,000 S1.  
 Ferguson Lake—18,000 S2.  
 Framboise River—45,000 A1, 70,000 A2.  
 Grand River—60,000 Ad, 105,000 A1, 35,000 A3.  
 Indian Lake—12,000 S1.  
 Kytes Lake—10,000 S1.  
 Lindloff or Hatchery Lake—8,240 S2.  
 Loch Lomond—165,000 A1, 35,000 A2, 35,000 A3.  
 MacLeod brook—10,000 S1.  
 Mary Ann's Lake—7,000 S1.  
 McIsaac Lake—10,000 S2, 1,500 Sf.  
 McKenzie Lake—30,000 S1.  
 McNab Lake—14,000 S1.  
 Mill Lake-East River Tillard—20,000 S1.  
 River Tillard, head of tidewater—240 Sh.  
 River Tillard, east—15,000 S1.  
 River Tillard, west—30,000 S1.  
 River Tom—14,000 S1.  
 Saint Esprit Lake—30,000 S1.  
 Sampson Lake—30,000 S1.  
 Scott brook—20,000 S1.  
 Straughton brook—10,000 S1.  
 Thompson Lake—7,000 S1.  
 Madame Island—  
 Babins Lake—25,000 S1.  
 Chain Lake—15,000 S1.  
 Forest Lake—30,000 S1.  
 Grand Lake—30,000 S1.  
 Potties Lake—25,000 S1.  
 Shaw Lake—20,000 S1.

## MARGAREE HATCHERY

*Cape Breton County—*

Black brook-Mira River—10,000 S5.  
 Ferguson Lake (New Boston)—10,000 S4.  
 Forester Lake—10,000 S3.  
 Giovanetti Lake—10,000 S4.  
 Grand Lake—Indian Bay—10,000 S4.  
 Jackson or Johnson Lake—15,000 S4.  
 Kilkenny Lake—10,000 S4.

McDonald or Widow Lake (New Boston)—10,000 S4.  
 McInnes Lake—10,000 S4.  
 McIntyre Lake (New Boston)—10,000 S4, 10,000 S5.  
 McMillan Lake—10,000 S3.  
 McPherson Lake (New Boston)—10,000 S3.  
 Scotch or Scott Lake—10,000 S4.  
 Trout Brook-Mira River—10,000 S5.

*Inverness County—*

Big brook-River Denys—40,000 S1.  
 Cheticamp River—50,000 Ad, 50,000 A1.  
 Farm brook—5,000 S4.  
 Galant brook—40,000 S1.  
 Glen brook-River Denys—10,000 S3.  
 Glenora brook—10,000 S1.  
 Grand Etang brook—20,000 S1.  
 Margaree River, northeast and tributaries  
 480,000 A1, 210,000 A2.  
 Big brook—25,000 S1.  
 Egypt brook—25,000 S1, 800 Sf, 600 Sg.  
 Forest Glen brook—25,000 S1.  
 Ingram (Ingraham) brook 25,000 S1, 533  
 Sg, 200 Sh.  
 Levis brook—25,000 S1.  
 Watson brook—10,000 S4, 600 Sf.  
 Margaree River, southwest—50,000 Ad,  
 100,000 A1.  
 Captain Allan's brook—35,000 S1.  
 Matheson Glen brook—25,000 S1.  
 McDonnell brook—15,000 S1.  
 McColl brook—15,000 S5.  
 McKenzie brook-River Denys—15,000 S4.  
 McPherson brook-River Denys—15,000 S4.  
 Mull River—50,000 A1.  
 Plaster ponds—600 Sh.  
 Plateau brook—40,000 S1.  
 Rough brook-River Inhabitants—17,000 S1.  
 Skye brook—10,000 S3.

*Victoria County—*

Aspy River, middle—30,000 A1.  
 Aspy River, north—30,000 A2.  
 Baddeck River—100,000 A1.  
 Farquar Angus or McDonald brook—  
 20,000 S1.  
 Gillis brook—20,000 S1.  
 Harris brook—5,000 S3.  
 Peter brook—40,000 S1.  
 Barasois River—50,000 S1.  
 Beinn Breagh Reservoir—200 S3.  
 Campbell brook (Estmere)—10,000 S1.  
 Dalem Lake (Boularderie Island)—20,000  
 S1.  
 Ethel Lake (St. Paul's Island)—1,500 S4.  
 Ingonish River—25,000 A1.  
 McKinnon Harbour brook—5,000 S1.  
 McLean brook (Ottawa brook)—3,000 S1.  
 McPhie brook (Southside Boularderie)—  
 5,000 S3.  
 Middle River—50,000 Ad, 50,000 A1.  
 Beaver brook—600 Sf.  
 Black brook—15,000 S1.  
 Cold brook—17,000 S1, 600 Sf.  
 Indian brook—40,000 S1.  
 McDonald brook—30,000 S1.  
 North River—115,000 A1, 35,000 A2.  
 Church brook—15,000 S1.  
 Washabuck River—50,000 S1.

## MERSEY PONDS

*Lunenburg County—*

Crouse Lake—1,500 S4.  
 Feener Lake—1,500 S4.

*Queens County—*

Broad River—3,500 S4.  
 Five-River creek—6,000 S4.  
 Louis Lake brook—3,600 S4.  
 Medway River—  
 Halfway brook (Port Medway)—3,000  
 S4.  
 Salter brook—3,000 S4.

Mersey River and tributaries—41,400 A3,  
 34,700 S4.  
 Beaverdam brook—5,000 S4.  
 Eagle Lake—5,000 S4.  
 George brook—5,000 S4.  
 Lower Great brook—26,000 A3, 3,000 S4.  
 Morton brook—57,000 A3.  
 Upper Great brook—66,000 A3.  
 Mitchell brook—2,400 S4.  
 Path Lake—5,900 S4.  
 Quarterway brook—3,000 S4.  
 Robertson Lake—2,500 S4.

## MIDDLETON HATCHERY

*Annapolis County—*

Annapolis River—25,000 A3, 5,000 S4.  
 Bear River, east branch—7,000 S3.  
 Cranberry Lake—6,000 S3.  
 Evans brook—5,000 S3.  
 Fishers Lake—12,000 S3.  
 Grand Lake—7,000 S3.  
 Jeny Lake—5,000 S3.  
 Katy or Cady Lake—5,000 S3.  
 Lake Pleasant—8,000 S3.  
 Lequille River—20,000 A3.  
 Little River-Annapolis River—8,000 S3.  
 Long Lake-Medway River—5,000 S4.  
 McGill Lake—8,000 S3.  
 Milburn or Milberry Lake—6,000 S3.  
 Morton brook—4,000 S4.  
 Nictaux River—30,000 A1, 5,000 S4.  
 Paradise brook—5,000 S3.  
 Paradise Lake—5,000 S3.

Parker brook—5,000 S3.  
 Round Hill River—50,000 A3.  
 Sandy (Sand) Lake—6,000 S3.  
 Sandy Bottom Lake—5,000 S3.  
 Shannon Lake—5,000 S4.  
 Shannon River—5,000 S4.  
 Slocomb brook—5,000 S3, 4,000 S4.  
 Stronach Lake—6,000 S3.  
 Thirty Lake—7,000 S3.  
 Walker brook—6,000 S3.  
 Waterloo Lake—10,000 S3.  
 Wiswal (Wiswell) brook—4,000 S4.  
 Young Lake—4,000 S3.

*Digby County—*

Haines Lake—4,000 S3.  
 Lake Jolly—8,000 S3.  
 Mallette Lake—6,000 S3.  
 Porter or Mistake Lake—8,000 S3.

*Hants County—*

Coxcomb or Cockscomb Lake—4,000 S4.  
 Falls Lake stillwater—7,000 S3.  
 Mockingigh Lake—7,000 S3.  
 Murphy Lake-Avon River—5,000 S3.  
 Panuke Lake—6,000 S3.  
 Pigot Lake—3,000 S4.

*Kings County—*

Gaspereau River—20,000 A3.  
 Thirty Lake, upper—6,000 S4.

*Lunenburg County—*

Bezanson Lake—7,000 S4.  
 Blystner or Blysteiner Lake—7,000 S3.

Canoe Lake, north—6,000 S4.  
 Card Lake—7,000 S3.  
 Gold River—30,000 A3.  
 Harris Lake—6,000 S3.  
 Indian Lake-Gold River—4,000 S4.  
 LaHave River, north branch—30,000 A3.  
 Lake William—8,000 S3.  
 Lewis Lake—4,000 S4.  
 New Germany Lake—4,000 S3.  
 Oakland Lake—5,000 S3.  
 Spectacle Lake, near Lunenburg—6,000 S4.  
 Wallaback Lake—7,000 S3.  
 Whetstone Lake—6,000 S3.

## NICTAUX FALLS REARING STATION

Nictaux River—25,000 Ac.

## YARMOUTH HATCHERY

*Digby County—*

Belliveau River—8,000 S1.  
 Carleton River—  
 Briar Lake, upper—3,000 S3.  
 Briar Lake brook—6,960 Sd.  
 Bullerwell brook—11,600 Sd.  
 At French Mill—2,000 S3.  
 Grosses Coques River, east branch—8,000 S1.  
 Grosses Coques River, west branch—8,000 S1.  
 Little Doucette Lake, near Hectanooga—2,500 S2.  
 Meteghan River—2,000 S3.  
 Bear brook—2,000 S3.  
 Fluid Lake brook—14,960 S1.  
 Meteghan Lake—2,000 S3.  
 At Meteghan Mills—6,500 S1.  
 Mill brook—20,000 S1.  
 Riviere-a-Margo—4,000 S1.  
 Stony brook—8,000 S1.  
 Toad brook—8,000 S3.  
 Provost Lake—4,000 S3.  
 Salmon River—14,000 A3.  
 Bony Lake—3,000 S3.  
 Dean brook—20,000 S1.  
 Hectanooga Lake—2,000 S3, 3,000 S4.  
 Whitewater brook—2,500 S4.  
 Sissiboo River—8,500 S3.  
 Tusket River, east branch (Silver River)—8,000 A3, 8,000 S4.

George A. brook—1,000 S3.  
 Hamilton creek—10,000 S1, 2,000 S3.  
 Hope Lot creek—4,000 S3.  
 MacDonald brook—6,000 S1.  
 At Middle Clyde—1,000 S3.  
 Old Barn brook—8,000 S1.  
 Potter's run—1,000 S3.  
 Salmon creek—10,000 S1, 1,500 S3.  
 Stacker's run—2,000 S3.  
 Downey River—4,500 S1.  
 Fresh brook—4,000 S1.  
 Granite Village brook—3,200 S3.  
 Green Harbour brook—2,400 S3.  
 Jordan River—25,000 A3.  
 Roseway River—20,000 A2.  
 Beaver creek—6,750 S1.  
 Bower brook—9,000 S1.  
 Clam creek—6,750 S1.  
 Clam Track brook—9,000 S1.  
 Deception Lake—8,000 S1.  
 Logging creek—11,250 S1.  
 McKay Lakes—12,000 S1.  
 Round-bay River—2,000 S3.  
 Tom Tigney River—2,800 S3.  
 Wall brook—1,600 S3.

*Yarmouth County—*

Allen Lake—2,000 S3.  
 Argyle River—  
 Long Pond brook—4,000 S3.  
 Moses creek—2,500 S3.  
 Carleton River—  
 Halfway brook—6,940 S1.  
 Harding brook—9,280 Sd.  
 Mink or Skinner Lake—1,500 S3.  
 Nickerson brook—6,960 Sd.  
 Pond brook—4,640 Sd.  
 Richardson Lake—2,000 S3.  
 Ryerson brook—6,960 Sd.  
 Salter brook—6,940 S1.  
 Sloan Lake—3,000 S3, 58 Sd, 2 Sh.  
 Sweeney brook—6,960 Sd.  
 Chegoggin River—10,000 S3.  
 Cook's Pond—500 S2.  
 Cranberry Bog brook—2,000 S3.  
 Darling Lake—122 Sk.  
 Lake Jesse—12,630 S2.

*Queens County—*

Tait Lake—362 Sf.

*Shelburne County—**Clyde River—*

Barrington River—4,500 S1.  
 Black brook (Shelburne Harbour)—8,000 S1.  
 Cleamons Pond—13,000 S1.  
 Clyde River—25,000 A3, 3,000 S3.  
 Birch Hill creek—500 S3.  
 Bloody creek—4,000 S3.  
 Cemetery creek—1,000 S3.  
 Dirty creek—3,000 S3.  
 Fairsen creek—6,000 S1.



*Yarmouth County*—Con.

Salmon River—2,000 S3, 840 Sf.  
 Bull Hill brook—2,000 S3.  
 Crosby brook—1,500 S3.  
 Gardner brook—2,000 S3.  
 Hamilton Mill stream—2,000 S3.  
 Hawley Road brook—6,940 S1.  
 Joshua Lake—2,000 S4.  
 Pleasant Valley brook—2,000 S3.  
 Saunders Mill—2,000 S3.  
 Scott brook—Chebogue River—1,000 S2.  
 Sunday Lake—3,000 S3.  
 Trefry Lake—10,000 S3.  
 Tusket River—40,000 A1, 24,000 A3, 9,500 S3.  
 Back brook—3,500 S4.  
 Beaver Lake—2,000 S3.

Braddies Meadow brook—2,000 S3, 2,000 S4.  
 Burrell brook—1,500 S3.  
 Coldstream brook—3,000 S3.  
 Gray brook—6,940 S1.  
 Kegeshook Lake—3,003 S3.  
 Little Meadow brook—6,940 S1.  
 Lloyd's Hole—2,000 S4.  
 Louis Lake—2,000 S3.  
 Meadow brook, Georges Little—1,000 S4.  
 Reuben brook—6,940 S1.  
 Savannah Meadow brook—3,000 S4.  
 Solomon Lake—5,500 S4.  
 Tinkham brook—6,940 S1.  
 Travis brook—1,000 S3.  
 Welches brook (Pubnico Harbour)—3,500 S3.

## NEW BRUNSWICK

## CHARLO HATCHERY

Charlo River, north branch, above dam—100 Sf.  
 Christopher brook—175 Sf.  
 Henry's Lake—100 Sf.  
 Jacquet River—52,320 Ad.

Nipisiguit River—111,720 A1.  
 Restigouche River—235,680 A2, 139,550 A3.  
 Kedgwick River—70,035 A1, 20,020 A2.  
 Matapedia River—160,035 A1.  
 Upsalquitch River—160,035 A1.

## FLORENCEVILLE HATCHERY

*Albert County*—

Petitcodiac River—170 Af.

*Carleton County*—

Acker brook-Saint John River—15,000 S1, 5,000 S3.  
 Basin brook-Presquile River—200 Sf.  
 Becaguimec River—90,000 A1.  
 Bennett Lake—200 Sg, 225 Sh.  
 Birmingham brook-Becaguimec River—20,000 S1.  
 Bubby brook-Saint John River—3,000 S1.  
 Bull creek-Eel River—20,000 S1, 300 Sf, 500 Sh.  
 Bull Lake-Nackawic River—3,000 S3, 400 Sf.  
 Bulls creek-Saint John River—20,000 S1, 500 Sf.  
 Burke brook-Shiktahawk River—2,000 S4, 2,000 S5.  
 Burnt Land brook-Becaguimec River—20,000 S1, 400 Sf.  
 Burpee brook-Presquile River—550 Sf.  
 Cold stream-Becaguimec River—25,000 S1, 10,000 S2, 5,000 S3, 3,000 S5, 1,100 Sf.  
 Colton brook-Shiktahawk River—5,000 S1.  
 Cross creek-Becaguimec River—10,000 S1.  
 Day brook-Becaguimec River—15,000 S1, 3,500 S4.  
 Debec brook-Sherwood Lake—20,000 S1, 1,200 Sf, 920 Sg.  
 Dingee brook-Presquile River—15,000 S1, 5,000 S3, 250 Sf.  
 Fall brook-Nackawic River—3,000 S3.  
 Gallivan brook-Little Presquile River—10,000 S1.  
 Gibson Mill Brook-Saint John River—500 Sg.

Gin brook-Becaguimec River—10,000 S1, 1,000 S4.  
 Guisiguit River—20,000 S1, 5,000 S4, 250 Sh.  
 Hagerman brook-Meduxnekeag River—20,000 S1, 5,500 S4, 400 Sf.  
 Hardwood brook-Saint John River—10,000 S1.  
 Harmon brook-Saint John River—10,000 S1.  
 Harold brook-Presquile River—10,000 S1.  
 Hatfield brook-Saint John River—10,000 S1.  
 Hayden brook-Becaguimec River—20,000 S1, 1,000 S4.  
 Johnville Beaver pond-Shiktahawk River—2,000 S4, 200 Sf, 300 Sg.  
 Knoxford Lake—800 Sf.  
 Lanes creek-Saint John River—10,000 S1.  
 Lily brook-Saint John River—15,000 S1, 2,500 S4.  
 Little Guisiguit River—20,000 S1, 10,000 S2, 10,000 S3, 1,000 S4, 400 Sf.  
 Little Presquile River—40,000 S1, 10,000 S2, 5,000 S3, 3,000 S5, 700 Sf.  
 Mallory brook-Saint John River—5,000 S3.  
 Maynes brook-Little Presquile River—10,000 S1.  
 McLeary brook-Lakeville pond—20,000 S1, 3,500 S4, 300 Sf.  
 Meduxnekeag River—100,000 A1.  
 Milbury pond-Saint John River—500 Sf, 400 Sg.  
 Mile brook-Presquile River—1,500 S3.  
 Miramichi River, southwest and tributaries—165,000 A1, 28,825 Af.  
 Monquart River—60,000 A1, 12,000 A2.  
 Moose Lake—400 Sf.  
 Murphy Lake—400 Sg.



*Carleton County—Con.*

Payson Lake—4,000 S3.  
 Presquile River—120,000 A1, 11,200 A2.  
 River des Chutes—10,000 S1, 4,000 S3,  
 2,000 S4, 600 Sf, 400 Sg, 128 Sk.  
 Rosamond Lake—400 Sh.  
 Shiktahawk River—60,000 A1, 12,000 A2.  
 Smith brook-Becaguimec River—5,000 S1.  
 Stickney brook-Saint John River—10,000  
 S3.  
 Sucker brook-Meduxnekeag River—10,000  
 S1.  
 Tweedie brook-Saint John River—3,000 S1.  
 Williamstown Lake—300 Sf, 1,100 Sh, 75  
 Sk.

*York County—*

Brown Lake—400 Sf, 300 Sg.  
 Cedar brook-Crooked brook—3,000 S1.  
 Charlie Lake-Shogomoc River—500 Sf.  
 Clinch brook-Little Magagadavic Lake—  
 20,000 L1, 10,000 L2, 7,000 L3.  
 Cross creek-Nashwaak River—30,000 S1,  
 2,500 S3.  
 Cranberry or Harvey Lake—25,000 S1, 600  
 Sg.  
 Davidson Lake—700 Sg.  
 Dead creek-Eel River—20,000 S1, 500 Sf.

Dunbar brook-Nashwaak River—2,500 S3.  
 George Lake—30,000 S1, 2,800 Sf.  
 Green Hill Lake-Keswick River—400 Sg.  
 Indian Lake—500 Sf.  
 Jones Forks-Keswick River—10,000 S3.  
 Joslin or Waterloo Lake—400 Sf.  
 Keswick River—75,000 A1.  
 Longs creek-Saint John River—15,000 S1,  
 5,000 S3, 3,000 S4.  
 Mactaquac River—35,000 A1.  
 McLellan brook-Eel River—3,000 S3.  
 Middle brook-Nashwaak River—15,000 S2.  
 Nackawic River—75,000 A1.  
 Nashwaak River—120,000 A1, 10,000 A2.  
 Nashwaakis River—25,000 S2.  
 Penniac brook-Nashwaak River—600 Sf.  
 Pokiok River—15,000 S1, 15,000 S2, 5,000  
 S3, 400 Sg.  
 Rusagonis River—5,000 S3.  
 Rustine (Risteen) brook-Eel River—10,000  
 S1.  
 Shogomoc River—25,000 S1, 600 Sf.  
 Skiff Lake—25,000 L1, 10,000 L2, 9,000 L3.  
 Taffa Lake—10,000 S2.  
 Tinkettle brook-Nashwaak River—10,000  
 S2.  
 Yoho Lake—600 Sf.

## GRAND FALLS HATCHERY

*Victoria County—*

Saint John River and tributaries—15,000  
 Ad, 835,000 A1, 99,450 A2.  
 Boutout brook—10,000 S1.  
 Hatchery brook, below falls—10,000 S1.  
 Little River—12,500 Sd, 215,000 S1.  
 Salmon River and tributaries—10,000 Ac,  
 60,000 A1, 200,000 A2.  
 Foley brook—15,000 S1.  
 Mooney brook—10,000 S1.  
 Ryan brook—60,000 S1.  
 Sutherland brook—12,500 Sd, 25,000 S1.

Tobique River and tributaries—45,000 A1,  
 160,000 A2.  
 Pokiok brook—85,000 S1.  
 Rocky brook—10,000 Sd.  
 Trout brook—10,000 S1, 4,000 S3.

*Madawaska County—*

Baker Lake—21,750 S3.  
 Caron Lake—21,500 S3.  
 Grand River—25,000 S1.  
 Green River—21,750 S3.  
 Iroquois River—21,000 S3.  
 Nine Mile brook—10,000 S1.  
 Quisibis River—21,500 S3.  
 Trout River—21,000 S3.  
 Unique Lake—21,500 S3.

## MIRAMICHI HATCHERY

Bartibog River—9,500 S1, 4,200 S2.  
 Black River—5,910 S1, 4,800 S2.  
 Eskedellie River—14,910 S1, 4,500 S2.  
 Grand Aldouane River—9,350 S1.  
 Miramichi River, northwest and tributaries  
 —1,008,000 Ad, 23,400 A1, 164,200 A2.

Miramichi River, southwest and tributaries—648,000 Ad, 459,000 A1, 72,000  
 A2.  
 Miramichi River, little southwest—540,000  
 Ad, 113,400 A1, 18,000 A2.  
 Pokemouche River—8,400 S2.  
 Little Tracadie River—8,400 S2.

## SAINT JOHN HATCHERY

*Albert County—*

Crooked creek—8,777 R3.  
 Little or Coverdale River—12,000 S2.  
 Petitcodiac River—1,100 A3, 390 Af.  
 Prosser brook-Little or Coverdale River—  
 12,000 S2.  
 Smith Lake-Petitcodiac River—500 Sf.  
 Turtle creek—25,000 S2, 1,200 Sf.

*Charlotte County—*

Chamcook Lake—28,000 L3, 3,282 Lf.  
 Clarence stream-Digdeguash Lake—10,000  
 Sd, 20,000 S1.  
 Crecy Lake—6,750 S3, 675 Sf.  
 Digdeguash River—125,000 S1, 10,000 S2,  
 3,500 S4, 1,900 Sf.

*Charlotte County—Con.*

Disappointment or Mistake Lake—20,000 Sd.  
 Eddy pond (Grand Manan Island)—1,000 S1.  
 Eel brook pond (Grand Manan Island)—2,500 S3.  
 Gibson Lake—7,700 S3, 770 Sf.  
 Goat brook-Canoose River—20,000 Sd.  
 Green Brown brook-Canoose River—25,000 Sd.  
 Leonard pond (Deer Island)—2,500 S3.  
 Little Pocologan River—700 Sf.  
 Long Lake-Lepreau River—475 Sf.  
 McDougall Lake—30,000 S2.  
 Mohannas creek—25,000 Sd.  
 New River—45,000 S1, 30,000 S2.  
 Otter Lake—South Oromocto River—20,000 Sd.  
 Piskahegan River—30,000 A1.  
 Sand Brook Lake—1,000 S4.  
 Seal Harbour Pond (Grand Manan Island)—2,500 S3.  
 Soap brook-Mohannas creek—20,000 Sd.  
 Spear's brook-Trout Lake—20,000 Sd.  
 Utopia Lake—45,000 S1, 30,000 S2.  
 Waweig River—25,000 S1.  
 Waweig River, west—24,000 S2.

*Kent County—*

Buctouche River—20,000 S1.  
 Buctouche River, south branch—15,000 S1.  
 Coal Branch River—20,000 S1.  
 Cocagne River—20,000 S1.  
 Kouchibouguac River—20,000 S1.  
 Mahalawodiac River or McKee Mill stream—20,000 S1.  
 Mill creek-Buctouche River—15,000 S1.  
 Murray brook-Cocagne River—20,000 S1.  
 Richibucto River—20,000 S1.  
 St. Nicholas River—15,000 S1.

*Kings County—*

Drummond pond-Hammond River—1,000 S2.  
 Hammond River—65,000 S2.  
 Kennebecasis River—95,000 Ad.  
 Headwaters—16,000 S2.  
 South branch—20,000 Sd, 33,500 S2.  
 Chestnut brook—10,000 Sd, 23,500 S2.  
 Cyr Lake—450 Sf.  
 Jeffries pond—750 Sf.  
 King brook—11,000 S2.  
 Knapp Lake—450 Sf.  
 McGregor brook—10,000 Sd, 4,000 S2.  
 McLeod brook—20,000 Sd, 5,000 S2.  
 Moss Glen Lake—15,000 S2.  
 Piccadilly brook—10,000 Sd, 15,000 S1, 6,000 S2.  
 Penobscuis River—1,200 S4.  
 Rockville dam-Trout creek—8,000 S2.  
 Sally brook—10,000 S1.  
 Sanction brook—250 Sf.  
 Smith creek—20,000 Sd, 20,000 S1, 5,000 S2, 1,200 S4, 800 Sf.  
 Stone brook—15,000 S1, 7,500 S2.  
 Studholm brook or Millstream—20,000 S1, 10,000 S2, 1,200 S4.  
 Trout creek—35,000 Ad, 6,000 S2.

Walton Lake—14,000 S2, 750 Sf.  
 Ward creek—20,000 S1, 38,500 S2, 400 Sf.  
 Wetmore Lake—5,000 S2.  
 Windgap brook—10,000 Sd.  
 Williams Lake—30,000 Sd.  
 Little John Lake—10,000 S2.  
 Mechanic Lake—Pollett River—400 Sf.  
 McKiel Lake—10,000 S2.  
 Mill brook-Hammond River—6,000 S2.

*Queens County—*

Bogel Lake—200 Sf.  
 Forks stream-Canaan River—20,000 S2, 1,800 S4.  
 Island Lake—15,000 S1.  
 Lake stream-Salmon River—10,000 S2.  
 Moose Lake-Musquash River—50,000 S1.  
 Morgan Lake—1,100 S4.  
 Newcastle creek—50,000 S2.  
 Salmon River—50,000 A1.  
 Square Lake-Nerepis River—20,000, S1.  
 Trout Lake-Musquash River—15,000 S1.

*Saint John County—*

Adams Lake—300 Sf.  
 Back dam-Saint John River—2,000 S1.  
 Balls Lake—19,500 S3, 1,950 Sf.  
 Beaver brook-Mispek River—20,000 S1.  
 Big Salmon River—63,522 A3.  
 Black River—40,000 S2.  
 Blindman Lake—300 Sh.  
 Boaz Lake—2,500 S1, 3,000 S2.  
 Brandy brook—4,000 S1, 1,000 S2.  
 Crow brook—9,000 R3.  
 Dead brook-Loch Lomond—20,000 S1, 5,000 S2.  
 Dolan Lake—20,000 S1, 5,000 S2, 500 S4, 200 Sf.  
 Douglas Lake—10,000 S1, 5,000 S2, 100 Sf, 350 Sh.  
 Eastern Lake, lower—4,000 S1.  
 Elderly brook-Little River—10,000 S1, 5,000 S2.  
 Germaine brook—20,000 S1.  
 Grassy Lake-Black River—20,000 S1, 1,500 S2, 500 S4.  
 Hanford brook—25,000 S2.  
 Hanson River—15,000 S1, 10,000 S2.  
 Hayns Lake—8,000 S1, 14,000 S2, 1,000 S4.  
 Henry Lake—40,000 S1, 1,000 S4.  
 Howe Lake—1,500 S1, 500 S2, 100 Sf.  
 Kelly brook-Saint John River—250 Sf.  
 Kelly Lake-Saint John River—2,000 S4.  
 Lily Lake-Rockwood Park—700 Sh.  
 Lilus Lake—10,000 S1.  
 Little River—28 Af, 8 Rk, 61 Lf, 25,000 S2, 111 Sf, 206 Sg, 361 Sh.  
 Loch Alva (Saint John and Kings Counties)—40,000 S1, 10,000 S2, 1,000 S4.  
 Loch Lomond—80,000 S1, 20,000 S2, 1,500 S4, 2,094 Sf, 875 Sg, 600 Sh.  
 Mayflower or Dark Lake—2,500 S1, 1,500 S2, 100 Sf.  
 McBrien Lake—862 Sf, 532 Sg.  
 McCracken Lake—5,000 S2, 1,521 Sf, 1,808 Sg, 600 Sh.

*Saint John County—Con.*

McDonald Lake—1,000 S2.  
 McGuire pond-Dolan Lake—800 S4, 280 Sf.  
 Mispick River—60,000 S2, 1,000 S4, 500 Sf.  
 Moose creek—500 Sf.  
 Mud Lake-Musquash River—200 S4.  
 Musquash River, west branch—1,102 S5.  
 Robinson Lake—1,000 S1.  
 Second Lake-Loch Lomond—40,000 S1, 10,000 S2, 1,000 S4.  
 Stephenson's pond-Loch Lomond—500 S4.  
 Taylor Lake—10,000 S2.  
 Third Lake-Loch Lomond—25,000 S1, 10,000 S2, 1,000 S4.  
 Treadwell Lake—10,000 S1, 1,000 S4, 300 Sf, 375 Sg.  
 Tynemouth or Ten Mile creek—50,000 Ad.  
 Wilnot stream-Loch Lomond—30,000 S1.

*Sunbury County—*

Oromocto River—80,000 Ad, 1,200 Sf.  
 Northwest branch—2,400 S4, 375 Sf.  
 South branch—25,000 Ad, 20,000 S2.

Big Morance brook—25,000 S1.  
 Half Moon Lake—10,000 S2.  
 Hardwood creek—25,000 S1.  
 Little Lake—500 Sf.  
 Otter brook—50,000 S1.  
 Three Tree creek—600 S4.  
 Shin creek—10,000 S2.

*Westmoreland County—*

North River-Petitcodiac River—1,800 S4.  
 Tait brook-Memramcook River—15,000 S1.

*York County—*

Cranberry brook-Magaguadavic Lake—20,000 S2.  
 Davis brook-Magaguadavic River—100,000 S1.  
 Digdeguash River—3,000 S4.  
 Lake George—250 Sf.  
 Musquash brook-Spendik Lake—25,000 S2, 200 Sf.  
 North brook-Third Lake—10,000 S2.  
 Oromocto Lake—1,000 Sf.  
 Palfrey brook—200 Sf.

## PRINCE EDWARD ISLAND

## CARDIGAN PONDS

*Kings County—*

Bear River—3,500 S3, 1,500 S4.  
 Big brook-Fortune River—8,000 S3, 4,000 S4.  
 Big pond (Hermanville)—6,000 S3, 4,000 S4.  
 Brudenell River—10,000 S3.  
 Buell's brook-Murray River—2,000 S3.  
 Burge's pond-St. Peter Bay—2,000 S3.  
 Cardigan River—5,000 S4.  
 Crane's pond-Morell River—9,000 S3.  
 Creed's pond-Sturgeon River—5,000 S3.  
 Dingwell's stream-Fortune River—4,000 S4.  
 Finlayson's pond-Greek River—6,000 S3.  
 Fitzpatrick's pond-Seal River—3,000 S3.  
 Fox River—2,000 S3.  
 Goose or Cow River—8,000 S4.  
 Hay River—3,500 S3, 2,000 S4.  
 Jenkin's pond-Greek River—2,000 S3.  
 Leard's pond-Morell River—8,000 S3, 2,000 S4.  
 MacLeod's pond-Murray River—5,810 S4.  
 McAulay's stream-Morell River—2,000 S3, 1,000 S4.  
 McDonald's pond-North Lake—1,000 S3.  
 McEwan's pond-Savage Harbour—2,000 S3.  
 McKinnon stream-Morell River—5,000 S3.  
 McLeod's pond-Midgell River—5,000 S3.  
 McPherson's pond-Montague River—4,000 S3.  
 McRae's pond-Montague River—8,000 S3.  
 Montague pond—10,000 S3.

Mooney's pond-Morell River—4,000 S3.  
 Morell River—76,000 A2.  
 Munn's brook-Brudenell River—2,000 S3.  
 Narrow creek-Boughton River—2,000 S3.  
 Naufrage River—5,500 S3, 4,000 S4.  
 North Lake—3,000 S3.  
 Poole's pond-Montague River—2,000 S3.  
 Priest pond (Bayfield)—2,000 S3.  
 Quigley's pond, Head of St. Peter Bay—4,000 S4.  
 Ross' pond-Boughton River—8,000 S4.  
 Sturgeon River—4,000 S3.  
 Webster's pond-Marie River—5,000 S3.  
 Whitlock's or Morrison's pond-Boughton River—12,000 S3, 4,000 S4.  
 Wigginton's brook-Boughton River—4,000 S3.

*Prince County—*

Barbara Weit River—5,000 S3.  
 Brae River—2,000 S3.  
 Cain's stream-Mill River—4,000 S3.  
 Clark's pond-Wilmot River—4,000 S4.  
 Dunk River—8,000 S3.  
 Enmore River—2,000 S3.  
 Gard's pond-Mill River—3,000 S3.  
 Green's stream-Miminegash pond—4,000 S3.  
 McArthur's pond-Foxley River—2,000 S3.  
 McWilliam's pond-Pierre Jacques River—4,000 S3.  
 Marchbank's pond-Trout River (Tyne Valley)—4,000 S4.  
 Myrick's pond-Little Tignish River—2,000 S3.  
 Old Woollen Mills pond-Tyron River—3,000 S3.



*Prince County—Con.*

St. Nicholas pond-Sunbury Cove—3,000 S3.  
 Sheen's pond-Trout River (Tyne Valley)—3,000 S3.  
 Sheep River—4,000 S3.  
 Tignish River—5,000 S3.  
 Tuplin's pond-Indian River—3,000 S4.  
 Wright Leard's pond-Dunk River—4,000 S3.

*Queens County—*

Ballen's stream-Pownal Bay—2,000 S3, 1,000 S4.  
 Beer's pond-Clyde River—5,000 S4.  
 Belle River—5,000 S3.  
 Cook's pond-Newton River—3,000 S3.  
 Gurney's stream-Covehead Bay—4,000 S3.  
 Hope River—5,000 S4.  
 Howell's brook-West River—3,000 S3.

Lane's brook-Vernon River—2,000 S3.  
 McAulay's stream-Tracadie Bay—2,000 S3.  
 McMillan's pond-Vernon River—2,500 S3.  
 McMillan's pond (Wood Islands)—4,000 S3.  
 McPherson's pond-Pinette River—3,000 S3.  
 Milton stream-North River—2,000 S3.  
 Parson's pond-Glynde River—4,000 S4.  
 Ross' pond-Vernon River—3,000 S3, 1,000 S4.  
 Simpson's pond-Hope River—10,000 S4.  
 Skye brook-West River—3,000 S4.  
 Southwest River—4,000 S4.  
 Watt's stream-Winter River—2,000 S3.  
 West River—9,000 S3, 11,000 S4.  
 Winter River—5,000 S3.  
 Winter River, north branch—4,000 S3.

## KELLY'S POND HATCHERY

*Kings County—*

Big brook-Fortune River—15,000 Sd.  
 Dingwell's stream-Fortune River—6,000 Sd.  
 East or Hillsborough River—5,000 S1.  
 Midgell River—60,000 Ad.  
 Morell River—431,600 Ad.  
 Ross' pond-Boughton River—10,000 Sd.  
 St. Peter Bay, head of—50,000 Ad.  
 Warren's pond-Head of East or Hillsborough River—5,000 S1.

*Prince County*

Bell's stream-Prevost Cove—4,000 S1.  
 Brae River—4,000 S1.  
 Carr's stream-Malpeque Bay—4,000 S1.  
 Currie's pond-Lit. Pierre Jacques River—4,000 S1.

Fitzgerald's pond-Grand River—4,000 S1.  
 Leard's pond-Trout River tributary to Lot 10 River—4,000 S1.  
 Waddell's pond-Traverse Cove—4,000 S1.  
 Wright Leard's pond-Dunk River—5,860 S1.

*Queens County—*

Bagnall's pond-Hunter River—5,000 S1.  
 Clark's stream-East River—5,000 S1.  
 Crooked creek-Wheatley River—4,000 S1.  
 Dixon's pond-De Sable River—10,000 Sd.  
 Glenfinnan River—5,000 S1.  
 Holms' pond-De Sable River—4,000 Sd.  
 Rackham's pond-Wheatley River—10,000 S1.  
 West River—15,000 Sd.

## APPENDIX No. 5

## REPORT OF ENGINEERING DIVISION

*By C. BRUCE, M.E.I.C., Chief Engineer*

The Engineering Division is responsible for all technical works undertaken by the Department in the Maritime Provinces, British Columbia and the Northwest Territories, where the administration of the fisheries is entirely or largely under the Federal Government. Generally these works include the removal of obstructions which prevent or impede the ascent of anadromous fishes to spawning grounds in rivers and lakes, the design and supervision of construction of fishways, fish hatchery establishments and other engineering works. The division also has charge of the administration work in connection with oyster and other mollusk fisheries in the Maritime Provinces including the issue of leases for oyster farming. The services of the Division are available to the Fisheries Research Board in connection with the preparation of designs for construction which the Board may undertake and in some instances for supervision of the works.



Due to scarcity of materials and equipment and to the unsettled labour situation, which continued to prevail throughout the year, it was difficult to carry out works with economy and dispatch.

The activities of the Division are reviewed hereunder.

## BUILDING FISHWAYS AND CLEARING RIVERS

Works under this heading involve:—

- (a) Surveys and the preparation of designs for the installation of fishways either in dams or to overcome natural falls or impassable barriers to the ascent of fish and
- (b) the removal of obstructions, to the ascent of fish, which may have accumulated in streams as a result of land slides, forest rubbish carried down by freshets, large trees which have fallen across the streams as a result of undermining of the banks and in some instances materials either placed or carried into the streams from the logging operations.

Through the activities of the local Fishery Inspectors, logging operations are, in general, being undertaken with greater care where they are located in areas drained by streams frequented by fish, as the operators have been brought to realize that it is less expensive to arrange, from the commencement of operations, to keep the streams clear of fallen material and culled logs than to be required to return afterwards and clear up the debris. In spite of this, however, jams composed of materials washed down from river banks during freshets and wind falls will continue to accumulate in stream beds where they may prove a menace to the continuous ascent of fish unless their removal is attended to. Works undertaken during the year are classified hereunder.

### NEW BRUNSWICK

*Salmon River, Victoria County.*—This river flows into the St. John River a short distance below Grand Falls and is frequented by salmon for spawning in important numbers. During the last several years gravel bars, which exist at the confluence with the St. John River, have become so shifted as to shallow the entrance and prevent salmon from entering during low water periods. A bulldozer was employed to improve the channels through this stretch to facilitate the entrance of salmon. It is difficult to provide permanent work in a situation of this kind but the benefit from a relatively small outlay, as occasion required, is well worthwhile.

*Miramichi River, Northumberland County.*—Continued investigations by the Fisheries Research Board, indicated that while previous work in clearing streams tributary to the Miramichi River, which are frequented by smelt for spawning, had improved conditions considerably, further improvement could be expected by extending this work. Accordingly, a number of small streams which smelt ascend for spawning from the Miramichi River were cleared of obstructions to increase the extent of the spawning areas.

### NOVA SCOTIA

*Tusket River, Yarmouth County.*—As indicated in the previous year's report, the investigation into conditions for the ascent of salmon at the Nova Scotia Power Commission's hydro-electric development on this river were continued. The investigation definitely revealed that no salmon ascended the fishway in the tailrace canal and, accordingly, surveys were made for modifying this fishway, the work on which will be undertaken during the coming year.

*Round Hill Brook, Annapolis County.*—The screen which has been maintained in this river from year to year, to prevent salmon from becoming stranded in a back channel, was installed.

*Pubnico Lake, Yarmouth County.*—Many years ago a canal was opened from Great Pubnico Lake to flood cranberry bogs which were being developed. This development has long since been abandoned but the diversion of water from the lake continued and the question of having it closed so as to increase the discharge of Barrington River, which flows from the lake, was urged by local people interested in the fishery of the river. After investigation into the property rights in the diversion canal, an agreement was reached with the owners and the canal was closed.

*Trout River, Lake Ainslie.*—A channel was opened through a gravel bar at the entrance of this brook into Lake Ainslie, to facilitate the ascent of trout which frequent the river in large numbers.

*River Denys, Inverness County.*—An obstruction to the ascent of fish which has formed in this river was removed.

*McLennan's Brook, Inverness County.*—In his patrol of this stream the Inspector found an obstruction consisting of logs and forest rubbish which completely barred the ascent of salmon and trout, which was removed.

*North River, Victoria County.*—Considerable work was done on this river in previous years to improve conditions for the ascent of salmon which has resulted in considerable improvement in the salmon runs. In places the river flows through rock canyons the side walls of which break off at times resulting in blocking the river to the ascent of fish. It was necessary to remove such a blockage during the year.

*East Brook, Guysboro County.*—An inspection of this brook, which is tributary to Country Harbour River, showed that it was obstructed by a series of six old driving dams. These dams were built many years ago for lumbering purposes and when operations ceased the gates were left open to provide a passage for fish. In time these gate openings had rotted and became obstructed by trash brought down by freshets. As the County Harbour waters are frequented by large numbers of salmon and trout, it was considered desirable to remove the obstructions in East Brook to permit them to ascend to suitable spawning grounds.

#### BRITISH COLUMBIA

*Lorenzetti Creek. (Fraser River Area).*—Three log jams which, if left in place, would have provided a complete blockage to the ascent of fish, were removed. The stream has valuable spawning areas for pink, coho and, occasionally, chum salmon.

*Kanaka Creek. (Fraser River Area).*—A number of large logs and debris which had formed a jam, preventing the ascent of fish, were removed and piled above high water mark. The stream is frequented by pink and chum salmon for spawning purposes.

*Nanoose Creek. (Nanaimo Area).*—Six log obstructions which had formed in the first two miles of this stream and threatened to become total barriers to the ascent of fish, were removed. Good runs of coho and chum salmon frequent the stream.

*Brunell Creek. (Nanaimo Area).*—Two log jams, occurring about half a mile from the mouth of this stream, were removed. Coho and chum salmon ascend this stream for spawning.

*Chemainus River. (Nanaimo Area).*—A large number of logs and debris which were bedded in the gravel near the mouth of the river, were removed, resulting in opening up the main channel for a width of from 60 to 70 feet through that portion where the main obstruction was originally lodged.

*Jolly Creek. (Nanaimo Area).*—This stream, which is frequented by a medium run of coho salmon was obstructed by sections of an old bridge, a considerable number of old logs and five beaver dams. All the obstructions were removed.

*Lower Lagoon Creek. (Quatsino Sound Area).*—A clear channel was cut through a large log jam half a mile from the north of this stream and channels were cut through three smaller jams. Coho and chum salmon ascend this stream.

*Tenaad River. (Quatsino Sound Area).*—Clear channels were opened up through three jams, consisting of small logs and debris, in the first half mile of this stream.

*Fraser Creek. (Alert Bay Area).*—A large boulder, at a falls some three hundred yards up this stream, was removed by blasting to improve conditions for the ascent of coho, pink and chum salmon which ascend for spawning.

*Fulmore River. (Alert Bay Area).*—A number of logs which threatened to form a jam and bring about a serious situation by obstructing the ascent of fish, were removed. Heavy runs of sockeye and pink salmon and a medium run of cohos ascend this river.

*Tuna River. (Alert Bay Area).*—Work on this stream consisted of the removal of accumulations of debris at the outlet of Seabird Lake, three jams of major proportions and six smaller jams, which if not removed, would have caused serious barriers to the ascent of valuable coho salmon runs to the spawning grounds.

*Nammon Creek. (Queen Charlotte Islands).*—A log jam which threatened to prevent the ascent of pink and coho salmon, was removed.

*Coal Creek. (Victoria Area).*—Two large obstructions, composed of logs and debris which had formed a total barrier to the ascent of chum and coho salmon to their spawning grounds, were removed.

*Atnarko River. (Bella Bella Area).*—This river which is frequented by important runs of sockeye, spring, coho, pink and steelhead salmon, is subject to frequent blockages due to the low-lying nature of some of the country through which it flows and careful attention is necessary to see that obstructions which might prevent these runs from reaching their spawning grounds do not form and reach such large proportions that it would be difficult to clear them. Work during the year consisted of the removal of a number of logs and river drift and cutting channels through several large log jams.

*Rosewall Creek. (Comox Area).*—Considerable work was done on this stream by local residents by way of protecting their property which also resulted in benefits from the fishery standpoint. A number of log jams which were removed using a donkey and blasting powder and gravel bars in the river which were causing the stream to deviate from its course were removed by a bulldozer. This stream is subject to heavy freshets causing erosion and silting. A proportion of the expense of removing the obstructions was borne by this Department because of the beneficial results and fish can now ascend the river to spawn.

*Markwell River. (Rivers Inlet Area).*—Serious erosion had been taking place to the river bank at one place on the Markwell River and there was great danger of the river breaking through to the Genesi River which would result in the destruction of valuable spawning areas in the latter stream. A number of large



trees, growing near the point where the break-through threatened, were felled across the mouth of the channel to form a rough dam. Although the work is of a temporary nature, it may last long enough to build up a silt bar and so prevent further erosion at this point.

*Stamp River. (Vancouver Island).*—A small expenditure was incurred in the interest of improving conditions in the fishway at Stamp Falls on this river.

*Koeye River. (Bella Bella Area).*—This watershed contains important sock-eye, coho and pink salmon spawning grounds and it was considered desirable to clear trails in order to facilitate inspections of the spawning grounds.

*Chuckwalla River.*—A log jam of some proportion existing in this stream about  $3\frac{1}{2}$  miles from its mouth was found to be assuming characteristics of a serious nature. A 60-foot channel was opened up through this jam. The stream is frequented by spring, coho, pink and chum salmon for spawning.

## FISH CULTURAL ESTABLISHMENTS

### NOVA SCOTIA

In addition to ordinary maintenance such as painting, etc., the following works were completed:

*Yarmouth Hatchery.*—Two circular ponds, each approximately 56 feet diameter and 5 feet deep at the centre, were constructed to provide deep water ponds for carrying brood stock over winter. The excavations for the pond were almost entirely in rock and it was necessary to line them with concrete to provide suitable smooth surfaces after the excavations were taken out. The work included a water supply dam with pipe line to the ponds and a drainage system.

*River Philip Salmon Pond.*—As the old concrete dam on the river, which is used in connection with the salmon retaining pond, had deteriorated badly, it was decided to rebuild the worst portion with concrete. A section some 135 feet long and varying in height up to 9 feet was entirely rebuilt. The old dam was not equipped with gates and it was decided to build two six-foot gates in the new section.

*Lindloff Hatchery.*—Some work was done in completing the cold storage and garage building, materials for which were not available during the previous year when the building was erected.

A survey was made for the construction of a concrete dam and pipe line. The present earth dam, which was formerly a mill dam, has shown signs of leakage and the wooden flume for the water supply to the rearing ponds and hatchery has reached a stage where renewal will soon be necessary.

*Bedford Hatchery.*—A stone rip-rap wall was placed along the driveway leading to the hatchery ponds. This part of the driveway is on Canadian National Railway property and the Railway carried out the work at the request of the Department.

*Cobequid Hatchery.*—One circular rearing pond was lined with concrete and a curbwall was placed around the perimeter. The Superintendent believes that this type of pond will prove excellent for holding fish over the winter.

*Coldbrook Rearing Ponds.*—The water supply dam at this system had developed a serious leakage under the gate opening and it was necessary to excavate down along the toe of the dam and entirely renew the plank face. At the same time it was found necessary to renew the stop-log slide timbers and repair the topping of the dam generally.



*Mersey Rearing Ponds.*—These ponds were established by utilizing the channel of the fishway which was built by the Nova Scotia Power Commission when No. 3 Power Development was built in the Mersey River. In many places this channel has now deteriorated and leaks have developed which result in loss of young fish held in the ponds. A survey was made looking to improving the worst section of the channel and it is proposed to undertake the work next year.

*Margaree Hatchery.*—As the concrete floor in the hatchery building had deteriorated badly, plans were prepared for completely renewing it with improved arrangement of troughs, etc. It is proposed that the work should be done next year.

#### NEW BRUNSWICK

*Charlo Hatchery.*—Due to the somewhat isolated location of this hatchery, making it necessary for the Superintendent to keep a horse for winter communication, a barn, seventeen feet six inches by twenty-eight feet, equipped with suitable accommodation for a horse and cow, was built.

*Grand Falls Hatchery.*—For a number of years seven rearing ponds each seventy-five feet long and four feet wide, have been operated at this hatchery. These ponds were originally built with two inch plank lining set on the requisite framing and this had become so rotted that renewal was necessary. Consideration was given to rebuilding with concrete but due to difficulty in procuring materials the plank linings were renewed.

*Haley's Brook Rearing Ponds.*—Investigation of several sites for a proposed salmon rearing pond system on the Tobique River, resulted in the selection of one on Haley's Brook as being the most suitable.

A preliminary survey of the site was made and a weir was built on the stream to procure information regarding the discharge.

#### OYSTER CULTURE

A detailed report of oyster culture work by Mr. R. R. Logie, who is in charge of operations in the Maritime Provinces, will be found under Appendix No. 6.

The issue of oyster leases in Prince Edward Island, Nova Scotia and in Gloucester County, New Brunswick, where leasing is under Federal Government jurisdiction, was continued during the year under review.

Seventy leases were issued in Prince Edward Island during the year. A total of 616 leases, having a combined area of 1445 acres, are now in effect in that Province.

In Nova Scotia 8 leases were issued and the total leases number 171, having a combined area of 405 acres.

Interest in leasing continued in Gloucester County and one of the difficulties was that sufficient suitable ground to satisfy all the applications received, was not available. 109 leases were issued during the year making a total of 332 having a combined area of 915 acres in effect.

Surveying in connection with oyster cultural work includes laying out areas for leases on the ground and marking the corners in a permanent way. Plans and descriptions of the areas are then prepared for inclusion in the leases. Surveying also includes the mapping of areas and other incidental work.

The following surveys were undertaken during the year:

1. Ninety new areas for leases in Prince Edward Island were surveyed and 35 re-surveys were made to re-establish the boundaries of leased areas, the markers of which had become lost or displaced.
2. Survey monuments in the Malpeque Bay and Foxley River areas, which had been destroyed, were replaced and triangulated, and additional monuments were set to facilitate shorter traverses in locating areas for leases.
3. Beacons on ranges marking the grid lines and lease boundaries in Sedgewick Cove, which had been destroyed, were relocated and replaced.
4. Additional beacons were located and set on the ranges marking the lease boundaries in Grand River Malpeque Bay Area.
5. In Nova Scotia ten surveys for new leases and two re-surveys to locate the boundaries of old leases were made.
6. Triangulation and stadia surveys were completed for the "St. Patrick Channel" Sheet of the Plan Showing Oyster Leases in the Bras-d'Or Lakes Area.
7. Range stakes marking the boundaries of leases in Denys Basin and Why-cocomagh Bay, which had been destroyed, were relocated and replaced.
8. In New Brunswick 82 surveys for new leases and 12 re-surveys relocating the boundaries of old leases were completed.
9. Attempts to resurvey the boundaries of old (formerly Provincial) leases in New Brunswick revealed that in practically all instances the boundaries of the areas as established on the ground, did not agree with the descriptions in the leases. This was probably due to the markers defining the boundaries having become shifted from year to year.

As it was found that the lessees would desire to retain the areas they were actually working, it was necessary to reach agreements with them under which the Department would resurvey their areas, and amend the descriptions in their leases to conform with these surveys. It is planned to complete as many of these resurveys as possible during the coming year.

#### GENERAL

*Gaspe Fisheries Experimental Station.*—The construction of the concrete seawall for protection of the property of this Station was undertaken by contract during the year. Due to unavoidable delays and difficulty in procuring materials it was not possible to complete the entire work which involved two sections of wall, one 290 feet and one 180 feet long.

The first section was completed but only some seventy feet of the second one and it will be necessary to continue the work next year.

A heavy storm in the late fall caused considerable damage to a section of old timber work protection located between the two concrete sections above referred to. It was hoped that this section would serve for several years before it would need to be replaced, but it now appears that it will be necessary to undertake the work next year and plans have been made accordingly.

The absence at Grand River, where this Station is located, of suitable living accommodation for the Director made it necessary to consider erecting a suitable dwelling. Designs were prepared and it is planned to proceed with the work during the coming year.

*Surveys for Experimental Trout Ponds.*—Surveys were made of several sites in Prince Edward Island for the establishment of Experimental trout ponds, which would be operated by the Fisheries Research Board. At Simpson's Brook, following the survey, designs for a dam were prepared and the construction was subsequently completed.

*Organization Charts, etc.*—In connection with the organization of the outside service of the Department the Engineering Division prepared organization charts for this service. Charts for re-organization of the Fish Culture Division and for the organization of the Fish Inspection Laboratory were also prepared.

Maps showing the boundaries of the fishery Inspectors districts on both the Atlantic and Pacific Coasts were prepared, and, due to changes in the lobster fishing regulations, it was necessary to revise the maps showing these districts.

## APPENDIX No. 6

### REPORT ON OYSTER CULTURE WORK UNDER THE DEPARTMENT OF FISHERIES FOR THE YEAR 1946-47

By R. R. LOGIE, Fisheries Research Board of Canada

The Department of Fisheries and the Fisheries Research Board co-operate in carrying on oyster culture work in the Maritime Provinces. In Prince Edward Island the work has been in progress since 1928, when the Dominion Government obtained jurisdiction over the Province's oyster areas and undertook to develop its oyster industry. A similar transfer of jurisdiction of the oyster areas of Nova Scotia occurred in 1936. Following the transfers, intensive investigations of various factors affecting the reproduction, growth rate, and survival of oysters under a variety of conditions were started, and ground was soon offered for lease in numerous inlets. In New Brunswick only the Shediac Bay area of Westmorland County and all Gloucester County are yet under federal jurisdiction, the transfer agreements having been completed in 1931 and 1944, respectively. The present status of the industry in each province is outlined below, and for detailed review of the early developments in various districts the reader is referred to appendices of previous reports of the Department.

Headquarters for the administration of field work in the three provinces are maintained at the Prince Edward Island Biological Station on Bideford River in the Malpeque Bay area. Here the Department has reserved areas for the development and demonstration of oyster culture methods, and for the production of spat for lessees. Although the methods which are developed here have wide application, many other places have special problems requiring local investigation. Other experimental farms are operated therefore at Orangedale, N.S., and Malagash, N.S., and steps are under way to institute one at Shippigan, N.B. Investigations are also under way on the Miramichi River, near Hardwicke, N.B.

#### A.—PRINCE EDWARD ISLAND

##### *Malpeque-Cascumpeque Region*

The principal object of the transfer in 1928 of jurisdiction of oyster areas in Prince Edward Island from the provincial to the federal government was to re-establish the oyster industry in this region. The oysters produced here constituted the greater part of the total Prince Edward Island production from 1880 to 1915 and they were of fine quality, but beginning in 1915 a mortality left the region almost devoid of oysters.

This area is the heaviest producer in Prince Edward Island. It can now be said that recovery from the disease is complete, and that a profitable industry has been re-established using the methods of oyster culture developed and advocated by the Board and the Department. It is here that oyster culture is



most extensively practised and that grading and inspection of the finished product have attained their highest levels. A consideration of the data in Table I and of the pertinent parts of the section "Economic Position of the Industry" demonstrate this point.

The spatfall was only moderate this year and the catch on collectors was consequently inadequate. This is the third consecutive year that this situation has prevailed and a good spat catch is needed soon to assure the continuance of the present high level of production.

#### *Summerside Harbour and Bedeque Bay*

This area is handicapped in that Summerside Harbour, the heavy producer, is polluted and consequently oysters produced there must be re-laid in pure water for a month before marketing. This necessitates double handling and consequently increases the cost of production. A special season of one month's duration is provided in the summer to allow the fishing and re-laying of these oysters on pure-water leases in Bedeque Bay. This season is too short to permit the proper exploitation of the oysters in Summerside Harbour but it is all that is possible in view of the present minimum re-laying period of one month. Experiments were conducted this year in this area in conjunction with the Department of National Health and Welfare to discover the actual time it took oysters to rid themselves of heavy pollution when re-laid in pure water. It is hoped that when the results of these experiments are fully considered a reduction in the re-laying period and a consequent increase in the length of the special fishing season may be permitted.

A further complication arose when it was discovered this year that Sedgewick Cove, one of the three coves of Bedeque Bay used as re-laying grounds, was polluted and its use as such was prohibited. This curtailed the available re-laying ground below minimum requirements but the danger was removed by lifting the ban on re-laying oysters from Summerside Harbour to Malpeque Bay.

The development of oyster farming in this area is shown in Table II.

#### *The Charlottetown River System and Hillsborough Bay*

In 1935 a mortality commenced in this area and within four years it reduced the annual production from 9,000 barrels to nothing. It is considered that this was attributable to the same disease that devastated Malpeque Bay in 1915 and ensuing years.

In 1942 the re-establishment of the industry began in the eastern shore of Hillsborough Bay, using for seeding purpose disease-resistant spat and small oysters obtained from the Department's reserve in Bideford river. Subsequently this revival has prospered, as shown in Table III, but the Department is unable to supply small oysters in sufficient quantities to meet the demand. Consequently an effort is being made to devote large portions of the Department's reserve to growing small oysters only. If this can be shown to be a profitable enterprise it is hoped that local commercial producers may take it up and relieve the Department of this obligation.

The Charlottetown River system is composed of the Eliot, Yorke, and Hillsborough rivers, known locally as West, North, and East rivers, respectively. In addition to the decimation of its population by the disease, this system also has a pollution problem similar to that of Summerside Harbour without the convenience of nearby re-laying grounds and such fishing as now goes on is confined to those areas in which the oyster population has recovered from the disease in pure water. Broadly speaking, this means in West River only and by public fishing only. However, a survey will be made to determine whether recovery from the



disease is sufficiently complete in all or any of the rivers to justify the granting of local demands for the formulation of a leasing policy for the district. Evidence exists to justify the belief that recovery is progressing slowly although the disease is known to be still present.

### B.—NOVA SCOTIA

Intensive work in Nova Scotia was not begun until 1936 when the Dominion Government obtained jurisdiction over the oyster areas of the province. Experimental stations where oyster culture methods suited to the special local conditions could be developed, were established in 1936 at Orangedale in the Bras d'Or Lakes area, and in 1937 at Malagash on Northumberland Strait. At the outbreak of war developments on leaseholds had just commenced and as yet it has been undertaken on only a small scale. Experiments in spat collection and rearing are providing information which will be useful in the future development of the industry. In Nova Scotia practically all ground is operated by individual small leaseholders with insufficient knowledge of oyster culture methods and it is probable that the production of high-quality oysters could be considerably raised by more intensive culture. This is particularly applicable to the Northumberland Strait shore.

#### *Bras d'Or Lakes*

The oysters produced here have weak shells, thin meats, and fresh flavour owing to the low salinity of the water. The value of the product is relatively low and emphasis is being placed on the development of the cheapest possible methods of oyster culture. Natural spat production is good in shallow water areas where lessees are allowed to pick, under permit, small oysters for stocking their leaseholds. Spat collection methods suitable to the region are also well developed.

Commencing in 1939 and continuing throughout the war years an attempt was made to market Bras d'Or oysters as shucked meats in bulk. In this venture local interested fishermen were assisted by the Department of Fisheries and the Nova Scotia Marketing Board. Such oysters must meet the competition of the American product and this is no longer possible due to low mass production costs in the United States. The project has, therefore, been abandoned.

#### *Northumberland Strait*

In this region the principal areas are Tatamagouche Bay, Caribou Harbour, Pietou Harbour and Merigomish Harbour. Conditions are suitable for the production of higher-quality oysters than in the Bras d'Or Lakes and the principal problems concern production rather than marketing. These problems have been largely solved at Malagash where attention has been given to the use of wide tidal flats which are prevalent in the region. The collection of spat on the flats has been developed successfully and in 1942-43 a convenient plan for holding oysters on collectors over the winter was developed by damming a small tidal creek. A dyke at Malagash is being used to rear spat for one or two years when they are large enough to be placed directly on leaseholds. The results of the investigations at Malagash with further modifications will be useful in developing oyster farming elsewhere.

A consideration of the data presented in Table IV, together with the realization that there is much high quality producing area in this region, shows that the effort is yet light but is improving with more intensive culture.

## C.—NEW BRUNSWICK

The important oyster producing areas of New Brunswick are the Shippigan-Caraquet region in Gloucester County and the Miramichi estuary in Northumberland County, both on a par with Prince Edward Island, as the three biggest producers. Both Kent County and the Shediac area of Westmorland County have small, falling productions. Of these the Shediac area was transferred to Dominion jurisdiction in 1931 and all of Gloucester County in 1944. No other transfers have been made.

*Gloucester County*

Shippigan and Caraquet are the centres of the oyster industry in Gloucester County. When all the numerous new applications for leases have been attended to there will probably be about 500 leaseholds in the county. Many of the leases now in effect have been well stocked with small oysters picked by hand along the shores at low tide but natural reproduction is erratic and a dependable source of seed stock is urgently required. For the past four summers an investigator has been stationed at Shippigan and progress has been made towards developing suitable spat collection methods and information has been obtained on the practicability of introducing spat from Nova Scotia.

Sufficient data have now been secured to warrant the establishment of an experimental oyster farm at Shippigan with a view to further developing oyster culture methods suitable to the area and illustrating them to local lessees. Steps have now been taken to implement this programme.

The progress of oyster culture is shown in Table V.

*Miramichi Estuary*

The Provincial Government still controls leasing in this area but an investigator was stationed there in the summers of 1945 and 1946 with a view to discovering practicable techniques which could assist the provincial lessees. Both summers were considered cold and unfavourable for the locality and little or no spat was caught. In addition, the area is almost constantly swept by winds frequently rising to storm proportions and the water is usually strongly agitated. These conditions make the prediction of sets and the catching of the spatfall difficult. The area does, however, experience a sufficient natural spatfall to keep it in the front rank of producers. The problem confronting the Board and the Department, then, is simply the discovery of workable methods. Investigations will be continued along this line.

*Shediac Bay*

Investigations at Shediac were carried out from 1931 to 1933 and were then postponed until 1940 owing to uncertainty of the public health situation. Subsequent investigations revealed that Shediac Bay suffers a spat loss due to strong tidal currents which carry the spat away from the producing area. The public beds have been heavily overfished and these two facts combine to keep the production at a much lower value than the area's potential. An attempt will be made to rehabilitate the industry in this area either by planting of the Department's reserve there to raise the spawning population or by importation of seed stock from outside sources or by both measures.

A further problem is the lack of a sufficient area to satisfy all the applications for leases but it is probable that changes in the boundaries of the public fishing reserve can be made.

## D.—GENERAL

*Revenue*

The sources of revenue from the Department's oyster culture work include the sale of oyster spat and medium-size oysters to lessees for stocking purposes, the sale of marketable oysters by tender from the Department's reserved areas, and rentals and royalties on leases. This income goes to consolidated revenue and is not credited to the vote but it serves to reduce the actual net cost of the work to the Government considerably below the amount expended under the appropriation. The appropriation in 1946-47, exclusive of cost of living bonus was \$31,050; through economy the expenditure was limited to \$22,700 and the revenue reduced the net cost to about \$13,400.

Table VI summarizes the revenue received in 1946-47 and in several preceding years. The details of quantities of oysters marketed and the prices received in previous years may be found in a similar table in preceding reports.

The principal cause of the rise in the 1946-47 revenue as compared to the previous few years is the increased sale of high-grade oysters from the Department's Cooper Bed reserve at high prices. The increased quantity obtained was due to a combination of the effort to prevent overaccumulation by intensive fishing and the unusually long and favourable fishing season.

The Department continued to supply spat and small oysters to lessees, particularly in areas attempting to recuperate from the disease. Little revenue is obtained from this source but the practice is invaluable to small holders and is being continued. A deliberate attempt will also be made to devote large areas of the Department's upriver reserve to the production of well-shaped small oysters. The demand for this type of oyster for stocking purposes far exceeds the Department's supply through the present casual fishing of the upriver beds. In addition to filling a greater portion of the orders received by this method the Department hopes to demonstrate to local growers that this can be a highly profitable venture.

*Results of Investigations and Experiments*

The results of Fisheries Research Board investigations and experiments are described in detail in its publications and only a brief summary will be given here.

Prediction of dates of settlement of oyster larvae was made for all areas in the Maritime Provinces where spat collectors are set out. The season was somewhat earlier than last year's and excellent catches were obtained on collectors at the Department's Orangedale and Malagash stations. In Malpeque Bay, however, the catch was light on the commercial growers' collectors, the majority of which were again put out at Trout River. The Department obtained a fairly good catch on its collectors which were put out in Paugh's Creek, as did one grower who did likewise. The water this year did not attain sufficiently high temperatures for successful spawning for protracted periods and therefore spawning was sporadic. This year's spat catch would seem to confirm the belief that in a poor season Paugh's Creek is the most effective catching ground although it may not be so in a good season.

No success was achieved in attempting to catch spat on the Miramichi and only indifferent success at Shippigan. Such negative results as were obtained in both these places, however, point the way to the proper methods.

Experiments on the rearing of oysters to market size on trays, commenced in 1941, were continued. This year the 1940 year class achieved market size, a very slow growth. However, this lot is not considered indicative due to the fact that all year-classes suffered a severe growth check as a result of the



scarcity of oyster food in the water in 1941. Year-classes subsequent to 1941 show much better progress and excellent shape, except for a tendency to shallowness. If a cheaper durable tray could be found the production of oysters might well be extended to many sheltered inlets with unsuitable bottom but otherwise ideal. This phase of the matter will be further studied.

Investigations into the correlation between sunshine, the amount of oyster food and growth of oysters were continued. The main emphasis was of necessity placed on the development of workable assay techniques. Some difficulties in the method are not yet overcome but such results as were obtained are promising.

The results of the oyster disease investigations at Enmore River and at Johnston River confirm the disease-resistance of Malpeque stock. They further show that the natural recovery of both Enmore-Perceval and the Charlottetown River system is progressing favourably. In both these areas the discovery of diseased oysters among the native population is now a rarity.

The spat from 3,600 collectors at Malagash, N.S., were wintered successfully in the small tidal creek which has now been successfully utilized for four years. This method of holding spat over winter was developed by Mr. M. D. MacDonald, the Department's foreman at Malagash, and is probably applicable to the whole area wherever such creeks occur. Mr. MacDonald's further suggestion that the creek be floored with poles will probably eliminate such deaths as now occur from smothering in the mud of the creek bottom.

### *Grading and Inspection*

In October, Inspector S. J. Homans, of the Department's Nova Scotia staff, inspected oysters in storage in Montreal and reported thereon. In February Inspector L. J. Murphy, of the Prince Edward Island staff, went to Montreal to investigate a complaint that oysters were not keeping well in storage.

Inspector Homans' reports indicated some degree of carelessness in cleaning oysters prior to shipment and this phase of packing will be given special attention next season. In general, packing and grading are better in Prince Edward Island and poorer in Nova Scotia and New Brunswick although there are exceptions.

Inspector Murphy's report showed nothing intrinsically wrong with the oysters as originally packed but did confirm extensive spoilage. This was due to flooding of the Montreal market during October. The better grades sell faster and the poorer grades, which do not store well, had to be held too long. The difficulty was, therefore, a marketing one only and could have been avoided by control of supply to the market.

### *Economic Position of the Industry*

The industry this year enjoyed the combination of high prices and good supply and the season was a highly profitable one. The total production of the Maritime Provinces in the 1946-47 season was about 36,000 barrels. Of these, New Brunswick produced 22,000 barrels, Prince Edward Island 10,000 barrels and Nova Scotia 4,000 barrels. These figures are in each case the combined production of public fishing reserves and of leaseholds. It can, however, be estimated that approximately half the total or some 17,000 barrels came from leaseholds as follows: Prince Edward Island 9,000 barrels, New Brunswick 6,000 barrels and Nova Scotia 2,000 barrels. In so far as leaseholds are concerned the main producers in each province are as follows: Prince Edward Island—Malpeque-Casumpeque; New Brunswick—Shippigan-Caraquet; Nova Scotia—Northumberland Strait shore. The comparison can be pushed no further without introduction of figures representing total acreage in each case and an estimation



of productive capacity. The figures quoted do, however, lend substance to the statement that production from leaseholds is greatest in Prince Edward Island. This can be ascribed both to more intensive leasing and to more intensive cultivation of leased ground. By inference they also ascribe to New Brunswick and Nova Scotia a higher potential than their present level of production.

There were indications that the Montreal market, which takes most of the oysters shipped, was at least temporarily glutted. This poses a new problem to the oyster industry of a supply in excess of demand. There would seem to be every reason to suppose that production will continue to rise and the marketing problem will therefore be aggravated.

The solution, obviously, lies either in the discovery of new markets or in the lowering of prices. The industry is aware of the situation through losses incurred by some incautious shippers this year and are considering the feasibility of regulating the flow of oysters to Montreal through the establishment of a marketing agency also commissioned to explore for new markets. These remarks are particularly applicable to Prince Edward Island.

In Nova Scotia both the quality and quantity of the yield from the Northumberland Strait shore could be raised by more vigorous cultivation. The difficulty to be overcome is the inertia of the small holder who is satisfied with the small additional income provided by the indifferent farming of oysters as a side line. There are signs that the present attractive prices are beginning to induce a more intensive effort from such holders and it is intended to distribute a circular setting forth clearly the increased profits from marketing high-grade oysters properly packed.

The introduction of proper workable oyster culture methods into the New Brunswick field would also do much to increase the yield and the Board and the Department have this matter in hand through investigations detailed above.

Efforts will also be made to persuade the small primary producer to grade and pack his product. Too many oysters are now either shipped to the market or sold to local buyers as "Ungraded for Shape". In this way too small a proportion of the profits is going into the pockets of the small holder and too much to middlemen. If more of the profits were realized by the small grower, he would be more easily persuaded of the benefits of proper cultivation of his holding. The Department reaches such leaseholders through the medium of Oyster Farming Circulars and a circular will be prepared on the subject.

TABLE I.—OYSTER FARMING IN THE MALPEQUE-CASCUMPEQUE REGION

	1942	1943	1944	1945	1946
1. Barrels of oysters sold.....	4,538	2,345	2,901	3,719	5,623
2. Wages paid by oyster farmers.....	\$ 8,538	\$ 8,268	\$ 8,450	\$10,053	\$10,987
3. Value of unpaid labour by lessees or assistants at \$1.75 per day for 1942-1945, \$4 in 1946.....	\$ 7,134	\$ 4,718	\$ 5,983	\$ 4,214	\$14,136
4. Money spent for materials used including collectors, spat and small oysters.....	\$10,155	\$ 6,035	\$ 7,263	\$ 7,540	\$ 9,127
5. Total expenditure.....	\$25,837	\$19,021	\$21,696	\$21,807	\$34,250
6. Receipts from sale of oysters (estimated at \$12.50 in 1946, \$10.50 in 1945 and \$9 in 1942-1944)	\$40,842	\$21,105	\$26,109	\$39,050	\$70,288
7. Profit.....	\$15,015	\$ 2,084	\$ 4,413	\$17,243	\$36,038

TABLE II.—OYSTER FARMING IN THE SUMMERSIDE AREA

	1942	1943	1944	1945	1946
1. Barrels of oysters sold.....	1,668	1,754	1,616	692	1,400
2. Wages paid by oyster farmers.....	\$ 874	\$ 1,567	\$ 6,285	\$ 525	\$ 725
3. Value of unpaid labour by lessees or assistants at \$1.75 per day for 1942-1945, \$4 in 1946.....	\$ 606	\$ 631	\$ 549	\$ 385	\$ 1,612
4. Money spent for materials used including collectors, spat and small oysters.....	\$ 1,263	\$ 3,391	\$ 3,573	\$ 3,055	\$ 3,406
5. Total expenditure.....	\$ 2,743	\$ 5,589	\$10,406	\$ 3,970	\$ 5,743
6. Receipts from sale of oysters (estimated at \$12.50 in 1946, \$10.50 in 1945 and \$9 in 1942-1944).....	\$15,012	\$15,736	\$14,544	\$ 7,266	\$17,500
7. Profit.....	\$12,269	\$10,147	\$ 4,138	\$ 3,296	\$11,757

TABLE III.—OYSTER FARMING IN HILLSBOROUGH BAY

	1942	1943	1944	1945	1946
1. Barrels of oysters sold.....		10	62	52	292
2. Wages paid by oyster farmers.....	\$ 61	\$....	\$ 120	\$ 5	\$ 781
3. Value of unpaid labour by lessees or assistants at \$1.75 per day for 1942-1945, \$4 in 1946.....	\$ 179	\$ 68	\$ 249	\$ 229	\$2,040
4. Money spent for materials used including collectors, spat and small oysters.....	\$ 212	\$ 75	\$ 105	\$ 60	\$ 409
5. Total expenditure.....	\$ 452	\$ 143	\$ 474	\$ 294	\$3,230
6. Receipts from sale of oysters (estimated at \$12.50 in 1946, \$10.50 in 1945 and \$9 in 1942-44).....	\$....	\$ 90	\$ 558	\$ 546	\$3,660
7. Profit.....			\$ 84	\$ 252	\$ 430
8. Loss.....	\$ 452	\$ 53			

TABLE IV.—OYSTER FARMING ON THE NORTHUMBERLAND STRAIT SHORE OF NOVA SCOTIA

	1939	1940	1941	1942	1943	1944	1945	1946
1. Barrels of oysters sold.....	294	265	676	596	652	668	534	720
2. Wages paid by oyster farmers.....	\$ 60	\$ 110	\$ 927	\$1,171	\$2,281	\$1,947	\$1,496	\$ 1,747
3. Value of unpaid labour by lessees or assistants at \$1.75 per day for 1942-1945, \$4 in 1946.....	\$ 902	\$ 663	\$1,763	\$ 715	\$1,025	\$1,107	\$ 609	\$ 748
4. Money spent for materials used including collectors, spat and small oysters.....	\$ 193	\$ 123	\$ 723	\$2,016	\$ 652	\$2,042	\$1,253	\$ 1,384
5. Total expenditure.....	\$1,155	\$ 896	\$3,413	\$3,958	\$3,902	\$5,096	\$3,358	\$ 3,879
6. Receipts from sale of oysters (estimated at \$12.50 in 1946, \$10.50 in 1945 and \$9 in 1942 to 1944).....	\$2,646	\$2,385	\$6,084	\$5,364	\$5,868	\$6,012	\$5,607	\$ 9,000
7. Profit.....	\$1,491	\$1,479	\$2,671	\$1,406	\$1,966	\$ 916	\$2,249	\$ 5,121

TABLE V.—OYSTER FARMING IN GLOUCESTER COUNTY

	1944	1945	1946
1. Barrels of oysters sold.....	3,711	2,460	4,453
2. Wages paid by oyster farmers.....	\$ 4,870	\$ 6,339	\$ 10,667
3. Value of unpaid labour by lessees or unpaid assistants at \$1.75 per day for 1942-1945, \$4 in 1946.....	\$ 2,909	\$ 5,233	\$ 16,420
4. Money spent for materials used including collectors, spat and small oysters.....	\$ 3,414	\$ 5,421	\$ 5,783
5. Total expenditure.....	\$11,193	\$16,993	\$ 32,870
6. Receipts from sale of oysters (estimated at \$12.50 in 1946, \$10.50 in 1945 and \$9 in 1942-1944).....	\$33,399	\$25,830	\$ 55,662
7. Profit.....	\$22,206	\$ 8,837	\$ 22,792

TABLE VI.—REVENUE FROM DEPARTMENT'S OPERATIONS IN 1946-47 COMPARED WITH THAT OF SOME PREVIOUS YEARS

(Items limited to previous years indented)	1946-47	1945-46	1944-45	1943-44	1942-43	1941-42
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Sale of separated spat—428 gals. @ 70c..	299 60		291 30	343 35		
Sale of separated spat—20 gals. @ 65c...	13 00	534 05		97 50		154 60
Threshing spat from collectors @ 2c.		3 20	12 20	3 00		
Threshing spat from 1,860 collectors at 1½c. each.....						27 90
Sale of 138 bbls. small oysters for stocking areas (at \$3.50 per bbl. in 1944, 1945, 1946; \$3.00 previously).....	483 00	582 75	546 00	415 50	579 00	400 50
Sale of marketable oysters (average price \$14.51 this year; \$14.10 in (1945-46).....						
Substandard, 48½ bbl. @ \$6.00, 75 bbl. @ \$8.10.....				291 00		607 50
Standard, 49 bbl. @ \$9.55; 10 bbl. @ \$9.25; and 27 bbl. @ \$8.00.....	776 45	686 40	1,028 10	617 33	2,915 05	4,471 20
Choice, 91 bbl. @ \$15.50; 30½ bbl. @ \$14.25.....	1,845 13	686 25	925 98	336 00	842 30	742 41
Fancy, 60 bbl. @ \$19.15.....	1,149 00	382 38	611 06	441 35	747 30	822 12
Sale of 4 bbls. 1944 spat from Ellerslie @ \$12.00.....	48 00					
Sale of 12 bbls. dyke-reared oysters from Malagash, at \$12.00 per bbl.....	144 00					
Sale of 18 bbl. oysters from Malagash, N.S., @ \$5.60.....						100 80
Sale of 3 bbl. 3 pks. oysters from Buctouche @ \$5.....						16 50
Sale of 68 gals. of spat from Bras d'Or lakes @ 50c.....						34 00
Logs purchased from Department by H. V. Carr.....						15 00
Fees for resurveys of boundaries of leases.....					5 00	4 00
Royalty on oysters taken from leases and rentals on leases.....	4,559 73	3,241 50	2,658 64	2,667 88	2,494 14	2,503 69
	9,317 91	6,116 53	6,073 28	5,212 91	7,582 79	9,900 22*

\* Highest revenue ever achieved.



## APPENDIX No. 7

**REPORT ON THE WORK OF THE CANNED FISH INSPECTION  
LABORATORY, VANCOUVER, BRITISH COLUMBIA,  
FOR THE YEAR 1946-47***By**F. CHARNLEY, Chief Chemist*

During the past year the investigations carried out by the Canned Fish Inspection Laboratory, exclusive of the work arising from the routine examinations, have been in part continuations of certain investigations summarized in previous reports and in part new investigations commenced in 1946. Progress on these problems has been, in general, quite satisfactory, but it should be mentioned that work on the major investigation, into quality of canned sockeye salmon described below under (5) is being held up owing to lack of certain equipment. In fact, if the required equipment is not delivered in the very near future, work on this investigation will be seriously delayed, since the greater part of the time available to the laboratory for research work comes in the months March to June inclusive.

(1) Incubation tests on samples of canned salmon and canned herring, representative as far as possible of the various canneries packing these two varieties of canned fish, were continued during the 1946-47 season, but the results were similar to those of preceding years, that is, no non-sterile tins were detected. These data taken in conjunction with those of preceding years point to an exceedingly low, if not vanishingly small, proportion of non-sterile tins in parcels of canned salmon and canned herring packed in British Columbia.

(2) The investigation commenced early in 1946 with the object of relating the crushing strength of the bones in canned herring with the time and effectiveness of processing has shown that further processing after 50 minutes rapidly diminishes the crushing force of the vertebrae in one-pound-tall canned herring and results in a relatively uniform and drastic softening of the bone tissue, which is only slowly altered by further treatment. For one-pound-tall herring packed in natural oil it would thus appear that, under normal cannery practice where these tins are processed for 70 minutes at 240° F., there is a factor of safety of about 20 minutes. These results enable the examiner to detect at once under-processing corresponding to 50 minutes or less in one-pound-tall tins.

(3) In July, 1946, an investigation was carried out to determine the mean and variance of the springing temperature of one-pound-oval canned herring. This work was undertaken in connection with parcels of British Columbia canned salmon and canned herring that were examined by the Sudan Medical Health Authorities in September, 1945. From measurements on 24 tins the average springing temperature was found to be 64° C. and the standard deviation in springing temperature was 5.75° C. The temperature required to produce 0.135 per cent or about  $\frac{1}{4}$  per cent springers in such a parcel is thus approximately 116° F. at normal barometric pressure.

(4) Further work on the identification of species of Pacific salmon has shown that the averages of 3 of each of the three characters used in the separations, namely, the length, the larger diameter and the smaller diameter of the vertebra, are apparently normally distributed and thus fulfil very closely the assumptions underlying Fisher's discriminant function method. The shorter diameter, however, seems to be slightly skewed even in averages of 3. Accordingly, since this measurement contributes less than the other two towards the separations, it may be preferable to discontinue the use of this measurement in the index.



(5) An extensive investigation into the quality of "late run" sockeye salmon commenced early in September, 1946, has revealed that the use of gill nets results in very definite selection of the sockeye salmon population in the Fraser River fishery. As shown in the writer's report on the first phase of this investigation, the average lengths of the sockeye salmon caught in gill nets are significantly higher than the corresponding averages of the fish taken in seines. The average length of the female sockeye salmon taken in gill nets, for example, was 0.940 inches greater than the average of the females taken in seines, and the corresponding difference for the male salmon was 0.697 inches. This evidence is reinforced by the observed change in sex ratio and by the direction of the change in sex ratio. As shown by the data obtained in this investigation, the ratio of males to females in the sockeye salmon taken in gill nets is significantly higher than the ratio of the two sexes in the salmon caught in seines. Furthermore, the direction of the change in this case was opposite to what would normally be expected, if the salmon of the genus *Oncorhynchus* behave in a similar way in this respect. These results indicate the need for further investigation of the effect of selection in the Fraser River fishery.

(6) In order to expedite the analyses of the experimental samples resulting from the investigation into quality of "late run" sockeye, methods and procedures for carrying out certain analyses, for example, protein nitrogen, and vitamin A, are being examined with the object of determining the most rapid procedures consistent with the limit of accuracy required in these analyses. Some work remains to be done on the method of determining vitamin A, but with this exception work on these methods has now been completed.

## APPENDIX No. 8

### REPORT OF THE FISH INSPECTION LABORATORY, HALIFAX, N.S., FOR THE YEAR 1946-47

By ERNEST HESS, PH. D.

The work of the laboratory was expanded during the year to include the inspection of frozen fish through a transfer of nine frozen fish inspectors to the staff of the laboratory, and by the establishment of seasonal regional laboratories for the inspection and grading of canned fish at Charlottetown, P.E.I., and Shediac, N.B. The main laboratory at Halifax became established in its own quarters on King's Wharf, during the year.

#### CANNED FISH

##### 1. GRADING

In addition to grading of lobster, chicken haddies, herring plain and in tomato sauce, flaked fish, lobster paste, Atlantic salmon and tuna carried out in the previous year, grading of "small herring", gaspereau, shad, shad fillets and kippered snacks has been added this year, and provisions made for grading flaked tuna, herring fillets and billfish.

The following table gives a summary covering a net total of 863 certificates issued for 355,178½ cases, as compared with 341,581¾ cases the previous year, and 133,897½ cases in 1944-45.

Kind of canned fish	Number of cases submitted	GRADING RESULTS			
		Fancy	Standard	Sub-Standard	Unfit
		p.c.	p.c.	p.c.	p.c.
Lobster.....	3,705	100.0			
Lobster Paste.....	4,421	67.9	29.2	2.9	
Chicken Haddies.....	157,429½	66.9	27.0	5.5	0.6
Flaked Fish.....	6,740	66.6	32.7		0.7
Mackerel.....	68,412	78.7	18.4	1.7	1.2
Mackerel Fillets.....	7,078	93.1	3.7	3.2	
Herring 15 oz.....	48,320½	58.6	34.5	6.3	0.6
Herring 10oz.....	33,905	51.7	40.1	7.5	0.7
Gaspereau 15 oz.....	19,840	66.9	31.9	0.6	0.6
Gaspereau 10 oz.....	1,437	91.2	8.8		
Shad.....	1,201	51.0	49.0		
Shad Fillets.....	1,425	86.6	13.4		
Kipperd Snacks.....	1,264*	4.3		6.8	88.9
Total—1946-47.....	355,178½	67.4	27.1	4.5	1.0
Total—1945-46.....	341,581½	69.0	22.4	7.7	0.9

\* Total pack of Kipperd Snacks is over 90,000 cases.

### RE-GRADING

Sixty-one lots of canned fish, comprising 42,491½ cases, were re-graded, appeals for such action being granted by the Minister. For 38 lots, comprising 31,575 cases (74.3%), the original grade was confirmed, while the remaining 23 lots of 10,916½ cases (25.7%) gained a higher grade.

### 2. INSPECTION

#### (a) Quality

Several kinds of canned fish which did not come under the grading regulation were inspected.

The following table gives a summary covering a net total of 99 "B" certificates issued for inspected goods and the percentage of each found acceptable according to standards established by the laboratory:—

Kind of fish	Number of cases submitted	Accepted	Rejected
		p.c.	p.c.
Finnan Haddie.....	2,985½ 48's	100.0	0.0
Gaspereau Fillets.....	1,078 48's	100.0	0.0
Herring in Tomato Sauce.....	1,000 48's	100.0	0.0
Sardines (5 oz.).....	1,629 48's	100.0	0.0
Sardines (¾ oz.).....	600 96's	100.0	0.0
Sardines (¾ oz.).....	16,033 100's	100.0	0.0
Sardines in Tomato Sauce.....	3,300 100's	100.0	0.0
Herring (Tails Only).....	26½ 48's	100.0	0.0
Herring (10 oz.).....	508 48's	100.0	0.0
Pollock.....	7,572 48's	97.3	2.7
Ground Cod Fish.....	109 48's	100.0	0.0
Clam Bouillon.....	266 48's	100.0	0.0
	35,107		

#### (b) Weight

A total of 72 lots of canned fish (herring 27, chicken haddies 13, mackerel 12, lobster 9, gaspereau 5, clams, alewives, mackerel fillets, flaked fish and pollock one each) were found to be shortweight, as determined from samples submitted for grading, or inspection or from routine samples examined by the fisheries inspectors or the laboratory.

### 3. RE-INSPECTION

Re-inspection of 27 lots was granted by the Minister, according to Section 22 (a) of the Regulations under the Meat and Canned Foods Act.

Of 15 lots found "unfit for food" when submitted for grading, 2,211 cases or 44.7 per cent were confirmed as unfit, 2,737 cases (55.3%) gaining a higher grade. The latter was achieved, partly, by splitting some of the original lots into sublots, some of which were suspected to contain most of the goods causing the low quality of the original lots.

Five lots of inspected canned fish which were of low quality, though not unfit, were also re-inspected; 284½ cases (26.3%) were confirmed as low quality ("Sub-Standard" or Grade B), 201½ cases (18.6%) were found unfit for food, and 595½ cases (55.1%) were found to be of higher quality.

Of seven re-inspected shortweight lots, five lots were confirmed as short-weight and two lots were released as correct.

### 4. ROUTINE SAMPLES

Four hundred and twenty-three samples, of three cans each, of various types of canned fish were withdrawn or submitted from fish and shellfish canneries in the Maritime Provinces during the canning season, namely: Chicken haddies 60, lobster paste 62, lobster 46, herring 35, mackerel 31, sardines 30, kippered snacks 29, tomalley 20, gaspereau 16, clams and smoked sardines 12 each, mackerel fillets 11, fish cakes and gaspereau fillets 9 each, finnan haddies and oysters 7 each, clam bouillon (clam juice) 5, fillets, salmon and smoked gaspereau fillets 4 each, mussels, pollock, tuna, cod fish, and cod livers 3 each, flaked fish 2, hake, sardine spread, shad fillets, crab meat, smoked eel, herring gelatine, gaspereau roe and cod roe, one each.

A report was prepared for each sample and copies mailed to the canner and fishery inspector concerned.

These routine samples serve at least two purposes. They give the canner the benefit of an independent examination and report on his product, and they are particularly valuable at the beginning of the packing seasons. An early warning of faults assures that the mistakes or carelessness in canning technique are remedied before the packing season is in full swing. Where canneries commence the canning of a product not previously canned in their plants, routine samples help to assure high quality of their pack from the beginning.

These samples also keep the laboratory informed of the quality of the various canned fish packs in general, from year to year. With the co-operation of the field staff of the laboratory serious faults can be investigated immediately and remedies suggested directly on the spot.

### 5. FIELD WORK

With the exception of those in Eastern Nova Scotia, most fish and shellfish canneries in the Division were visited by staff members at least once during the canning season. Special efforts were made to visit kippered snacks canneries and sardine canneries in Westmorland County, N.B., as both operations were new to many canneries. Two newly appointed canning technologists were attached to the Charlottetown and Shediac seasonal laboratories for part of the canning season and visited the Prince Edward Island and New Brunswick East shore canneries. The Director made several visits to the Shediac laboratory, which operated under Mr. A. Hollett from May 29 to August 22, and to the Charlottetown laboratory operated under Mr. R. E. S. Homans from June 12 to October 11. Mr. Homans made six trips to the Magdalen Islands to carry out grading of canned fish there.



## 6. CANNING RESEARCH

Several cases of serious losses suffered by canneries from "stackburn" of canned fish led to a short investigation of this problem. Experimental canning showed that hake is quite sensitive to overprocessing. Tests also showed that high trimethylamine values of "chicken haddies" must be interpreted with caution, as they may be caused by heat breakdown as well as bacterial breakdown of trimethylamine oxide.

Several experimental packs of canned cod livers were prepared and the influence of the processing on Vitamin A values studied. The results from winter caught shore cod were inconclusive and it is planned to repeat the tests on livers with high initial Vitamin A values.

## SANITARY CONTROL OF THE SHELLFISH INDUSTRY

The conditions in the scallop industry at Digby were checked periodically through the season by means of temporary laboratory facilities set up at Digby. While the methods of shucking and handling of scallop meat in the boats and shore plants were fairly satisfactory, the method of shipping scallop meats to market leaves many improvements still to be accomplished.

Considerable attention has been paid to the sanitary conditions in chilled lobster meat plants and to the waters in which live lobsters were held. Temporary laboratory facilities were set up, from one to two weeks each, at Digby and Pughwash, N.S., Borden, P.E.I., Cape Tormentine and St. Andrews, N.B., and tests made at other points as well. A steady improvement is noticeable in most plants.

Clam shucking plants in Charlotte County, N.B., and Halifax, Digby and Yarmouth counties, N.S., were visited.

Mr. W. J. Brownlee, who is in charge of this work, was attached for three weeks to the mobile laboratory of the Department of National Health and Welfare, working in the Charlottetown and Summerside areas. He and the Director attended the meetings of the Interdepartmental Committee on Shellfish Control in Ottawa in January.

A 3-ton dental lorry has been obtained from War Assets Corporation and is being fitted out as a mobile laboratory for shellfish control work. This unit is expected to be in the field by the middle of May, 1947.

## FROZEN FISH INSPECTION

A total of 5,068,725 pounds of frozen cod fillets produced in 13 plants in the Division for the French Supply Council were inspected during production, certified and marked by the staff of the laboratory. The shipments received additional 'spot inspections' at time of loading aboard ship at Halifax. Another 29,895 pounds of fish submitted by processors were rejected; all accepted goods passed the spot inspection at time of shipment.

Frozen fish, totalling 1,698,370 pounds, shipped by Gaspé processors via Halifax underwent spot inspection at time of loading aboard ship. None were rejected.

Frozen cod fillets, 1,050,000 pounds, produced at Halifax for the British Ministry of Food were similarly inspected, certified and marked; 15,000 pounds were rejected. These goods also passed spot inspection at time of transfer to Montreal for shipment overseas.

One hundred and ninety-three samples of fresh and frozen fish submitted by the frozen fish inspectors were analysed at the laboratory for trimethylamine content.



The Director visited all frozen fish processing plants in the Division. Considerable time was also spent in discussing with processors ways and means of inspection of frozen fish during production and marketing to increase domestic consumption. A survey of marketing facilities for inspected frozen fish in Toronto was undertaken.

### SALT FISH

Fifty-seven samples of salt fish were submitted for moisture determinations by various salt fish firms and fisheries inspectors.

Investigations have been carried out to arrive at a standard procedure for withdrawal of samples from parcels of salt fish and a standard test for moisture determination in salt fish to assist in the grading of salt fish. Recommendations have been presented to the Department.

### EDUCATIONAL

Mimeographed circulars on technological subjects were issued as follows: No. 9 Canning Cod Livers, No. 10 Canning of Atlantic Tuna, No. 11 Recommendations for Improvements in Shucking and Handling of Scallop Meats.

A circular (No. 34), "The Preparation of Marinated Herring", was also issued in the Atlantic Fisheries Experimental Station series.

A 10-day refresher course was given to the frozen fish inspectors in November.

The Director and staff gave lectures and practical instruction on fish canning throughout the course for fisheries inspector trainees. Some of the frozen fish inspectors acted as instructors on fresh and frozen fish during the course and Mr. R. E. S. Homans gave daily lectures on biology.

The Director took part in two short courses for fishermen arranged by the St. Dunstan's University Extension Department at Rustico and Mont Carmel, P.E.I.

Several fisheries inspectors received instructions at the Halifax laboratory on the determination of moisture content in salt fish, and a Quebec (Magdalen Islands) inspector received training on the inspection and grading of canned fish.

### LIAISON WITH TRADE AND ADMINISTRATIVE BRANCH OF THE DEPARTMENT

The laboratory has been in almost daily contact with the office of the Chief Supervisor of the Eastern Division. When in the field, the Director and staff have kept in close touch with the fisheries supervisors and inspectors.

The Director attended meetings of canners and inspectors at Digby, Truro, Sydney, N.S., and Saint John, N.B., in May and of lobster dealers at Moncton in August. He attended the district inspectors' conference at Sydney in December and the supervisors' conference in Halifax in November. The Director also attended meetings of the Prince Edward Island Fisheries Federation and the annual meetings of the United Maritime Fishermen at Amherst, N.S., and the New Brunswick Fish Canners and Assemblers' Association at Moncton, N.B. In January the Director attended the annual meetings of the Fisheries Research Board of Canada at Ottawa and of the Canadian Committee on Food Preservation at the National Research Council laboratory.

After the opening of the new Fish Inspection Laboratory quarters on King's Wharf, on September 25, the staff held 'open house' to the staffs of the Atlantic Fisheries Experimental Station, Chief Supervisor's office, Salt Fish Administrator's office and Food and Drug Laboratory, and later to the officials attending the supervisors' conference, to demonstrate the new laboratory and office facilities. The total staff of the Fish Inspection Laboratory during the year, including seasonal employees at Shediac and Charlottetown rose to 25.

# APPENDIX No. 9 Statement of Revenue Received During Fiscal Year 1946-47

Class of Revenue	Total	General Account	Nova Scotia	Prince Edward Island	New Brunswick	Ontario	Quebec	British Columbia	Yukon	Manitoba	Northwest Territories
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Privileges, Licences and Permits—</i>											
Fishing Licences.....	48,465 25		8,286 75	907 25	10,000 25	21 00		27,679 00	205 00	160 00	1,206 00
Modus Vivendi.....	4,261 00		102 00					159 00			
Oyster Leases.....	4,449 81		632 35	2,506 59	1,309 87						
Trawler Licences.....	2,875 00		2,875 00								
Rentals.....	1,097 64			124 93	942 71			30 00			
<i>Proceeds From Sales—</i>											
Pelagic Sealing (Sales of Skins).....	866,721 27	866,721 27									
Sales of Fingerlings.....	1,006 80	105 00	6 00	276 80	619 00						
Sales of Oysters.....	3,884 39		4 16	3,880 23	1,519 11	43 90	86 00	5,666 86		56 31	
Sundry Sales.....	8,061 65	407 03	90 32	162 12							
<i>Service and Service Fees—</i>											
Canned Salmon Inspection Fees.....	6,789 56							6,789 56			
Canned Herring Inspection Fees.....	8,192 07							8,192 07			
Miscellaneous Services.....	440 00		440 00								
Canned Pilchard Inspection Fees.....	21 79				21 00			21 79			
Rental of Equipment.....	21 00										
<i>Refunds of Previous Years' Expenditure.....</i>	7,222 16	4,937 34	1,768 91	8 00	198 05		60 35	171 51			
<i>Miscellaneous—</i>											
Premiums on Foreign Currency.....	176 63	176 63									
Fines and Forfeitures—											
Fisheries Act.....	12,101 21		1,181 16	2,272 52	2,531 34			6,116 19			
Northern Pac. Halibut Protection Act.....	400 00							400 00			
Fish Inspection Act.....	155 00		55 00						100 00		
Meat and Canned Foods Act.....	143 00			53 00					90 00		
Conscience Money.....	15 00	15 00									
Total Ordinary Revenue.....	972,500 23	872,422 27	15,460 65	10,191 44	17,141 33	64 90	146 35	55,255 98	205 00	406 31	1,206 00
<i>SPECIAL RECEIPTS</i>											
Miscellaneous War Revenue.....	560 06		22 00		638 06						
GRAND TOTAL.....	973,160 29	872,422 27	15,482 65	10,191 44	17,779 39	64 90	146 35	55,255 98	205 00	406 31	1,206 00

Certified Correct,  
F. O. WEEKS,  
Chief Treasury Officer.

Certified Correct,  
STEWART BATES,  
Deputy Minister.

## Fiscal Statement Department of Fisheries 1946-47

Vote No.	Appropriation	Amount Authorized	Expenditure
ORDINARY EXPENDITURE			
Statutory	Miscellaneous Civil Service Gratuities.....	\$ 994 00	\$ 994 00
Statutory	Minister's Salary and Car Allowance.....	12,000 00	12,000 00
76	Departmental Administration.....	170,340 00	158,526 43
77 & 729	Salaries and Disbursements of Fisheries Officers and Guardians.....	1,888,150 00	767,697 00
	Fisheries Patrol Service.....		429,128 67
	Fisheries Protection Service.....		398,811 05
78	Building Fishways and Clearing Rivers.....	25,000 00	4,630 50
79	Educational Extension Service.....	78,780 00	24,572 37
80	Fish Culture.....	230,000 00	221,579 73
81	Oyster Culture.....	36,280 00	24,308 55
82	Fisheries Research Board of Canada, Operation and Maintenance.....	740,610 00	664,362 99
83	Fisheries Research Board of Canada, Construction and Improvements.....	162,500 00	52,965 77
84	International Fisheries Commission (Halibut).....	30,000 00	25,775 10
85	International Pacific Salmon Fisheries Commission.....	42,000 00	39,043 24
86	International Pacific Salmon Fisheries Commission (Hell's Gate).....	400,000 00	169,480 99
87	Grant to the United Maritime Fishermen.....	3,000 00	3,000 00
88 & 730	Expenses re Pelagic Seal Skins.....	425,000 00	419,885 34
89	Harbour Seal Bounty.....	30,000 00	21,960 00
Statutory	Fishing Bounty.....	159,992 85	159,992 85
	Total Ordinary Expenditure.....	\$ 4,434,646 85	\$ 3,598,714 58
SPECIAL EXPENDITURE			
90	Extension of Education Work in co-operative producing and selling among fishermen.....	56,000 00	54,880 23
91	Administrative expenses of Fisheries Prices Support Act 1944.....	60,000 00	.....
92 & 731	Construction of a vessel for experimental fishing for Herring and Mackerel.....	47,000 00	42,659 36
732	Expenses of Fisheries Technologist in Japan and of Observer at meetings of International Council for Exploration of the Sea at Stockholm, Sweden.....	5,500 00	3,764 36
	Total Special Expenditure.....	\$ 168,500 00	\$ 101,303 95
DEMobilIZATION AND RECONVERSION			
506	Assistance in Construction of vessels of the Dragger Type and Conversion of Fishing Schooners to Draggers.....	150,000 00	87,815 96
507 & 911	Construction of Fishermen's Floats, Prince Rupert, B.C....	60,000 00	22,451 37
508	Salt Fish Export Regulations (Administration).....	25,000 00	16,229 53
509	Administration Canned Fish Regulations.....	25,000 00	9,018 09
912	Interest Charges on Purchase of 1945 Canned Salmon Pack for British Govt.....	6,000 00	2,300 93
913	Compensation for War Damage to Fishing Boats.....	2,000 00	1,320 00
910	Assistance in Construction of vessels of the Dragger and Long Line Type, Atlantic Coast.....	150,000 00	.....
	Total Demobilization and Reconversion.....	\$ 418,000 00	\$ 139,135 88

	EXPENDITURE
(a) Government of the United Kingdom—Fisheries	
Canned Salmon.....	31,297 40
Canned Herring.....	370,423 52
(b) United Kingdom General Settlement Account—(Finance Dept.)	
Canned Salmon.....	138 65
Canned Herring.....	24,728 88
(c) Pacific Halibut Treaty—Loans and Advances.....	23,303 30
Pacific Salmon Treaty—Loans and Advances.....	26,640 15
Pacific Salmon Treaty (Hell's Gate)—Loans and Advances.....	159,890 50
Province of British Columbia (Fisheries Research Board)—Loans and Advances.....	1,692 93
(d) Atlantic Herring Investigation.....	59,476 02
GRAND TOTAL.....	\$ 4,487,288 00

## DEPARTMENT OF FISHERIES

(a) Purchase of Fish by the British Government for which payment received through United Kingdom Payments Office.

(b) Purchase of Fish by the British Government. Credit of \$24,728.88 for Canned Herring due to refund received for fish which had been purchased in the previous fiscal year.

(c) Balance due by the United States Government and the Province of British Columbia at the close of the Fiscal Year 1946-47 on account of Divisible Expenses.

(d) Expenditure made on account of the Atlantic Herring Investigation was \$59,476.02 of which \$11,895.20 was made through the Fisheries Research Board (Vote 82) the balance of \$47,580.82 being charged to various Provinces of the Dominion and Newfoundland.

Certified Correct,

F. O. WEEKS,

Chief Treasury Officer.

Certified Correct,

STEWART BATES,

Deputy Minister.

### Salaries and Disbursements of Fishery Officers and Guardians

#### EXPENDITURE AND SUMMARY 1946-47

##### NOVA SCOTIA—

General.....	2,543 70	
Head Office.....	27,540 22	
District No. 1.....	52,517 66	
District No. 2.....	76,387 92	
District No. 3.....	78,352 43	
	<hr/>	\$ 237,341 93

##### PRINCE EDWARD ISLAND—

General.....	378 69	
District No. 1.....	48,300 67	
	<hr/>	48,679 36

##### NEW BRUNSWICK—

General.....	\$ 1,391 30	
District No. 1.....	36,316 42	
District No. 2.....	75,157 25	
District No. 3.....	49,188 54	
	<hr/>	162,053 51

CANNED FISH INSPECTION OFFICE—EAST COAST..... 63,902 94

FISH CURING INSTRUCTION SERVICE..... 10,213 24

GENERAL ACCOUNT (East)..... 5,074 45

##### MANITOBA—

Central Fisheries Division..... 19,222 34

##### BRITISH COLUMBIA—

Head Office.....	\$ 32,788 38	
District No. 1.....	39,986 02	
District No. 2.....	66,290 50	
District No. 3.....	58,912 01	
	<hr/>	14,797 21

CANNED FISH INSPECTION OFFICE—WEST COAST..... 212,774 12

YUKON TERRITORIES..... 37 88

GENERAL ACCOUNT (West)..... 8,397 23

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\$ 767,697 00

#### SUMMARY

Nova Scotia.....	\$ 263,738 81
Prince Edward Island.....	75,076 23
New Brunswick.....	188,450 39
Manitoba.....	19,222 34
British Columbia.....	221,171 35
Yukon Territory.....	37 88
	<hr/> <hr/> \$ 767,697 00



*Fisheries Patrol Service*

## EXPENDITURE AND SUMMARY, 1946-47

NOVA SCOTIA—			
District No. 1			
Chartered Boats.....	\$	984 39	
			\$ 984 39
District No. 2			
Departmental Boats.....	\$	17,089 53	
Chartered Boats.....		2,455 84	
			19,545 37
District No. 3			
Departmental Boats.....	\$	15,095 49	
			15,095 49
			\$ 35,625 25
PRINCE EDWARD ISLAND—			
Departmental Boats.....	\$	4,861 07	
Chartered Boats.....		8,890 76	
			13,751 83
			\$ 13,751 83
NEW BRUNSWICK—			
District No. 1			
Departmental Boats.....	\$	19,630 82	
			\$ 19,630 82
District No. 2			
Chartered Boats.....	\$	16,426 96	
			16,426 96
			36,057 78
EAST COAST GENERAL.....	\$	278 68	
			278 68
BRITISH COLUMBIA—			
District No. 1			
Departmental Boats.....	\$	62,674 41	
			\$ 62,674 41
District No. 2			
Departmental Boats.....	\$	100,225 42	
Speed Boats.....		74 66	
Chartered Boats.....		60,501 34	
			160,801 42
District No. 3			
Departmental Boats.....	\$	45,441 98	
Chartered Boats.....		37,945 07	
			83,387 05
Digby Island Warehouse.....	\$	5,172 66	
New Westminster Warehouse.....		12,262 69	
General.....		678 50	
			18,113 85
Air Service			
District No. 2.....	\$	5,400 00	
District No. 3.....		3,438 40	
			8,838 40
British Columbia General.....			9,600 00
			343,415 13

## SUMMARY

Nova Scotia.....	\$	429,128 67
Prince Edward Island.....	\$	35,718 15
New Brunswick.....		13,844 72
British Columbia.....		36,150 67
		343,415 13
	\$	429,128 67

*Fisheries Protection Service*

## EXPENDITURE SUMMARY, 1946-47

East Coast General.....	\$	107,551 08
West Coast General.....		291,259 97
	\$	398,811 05

*Educational Extension Service*

## EXPENDITURE 1946-47

Aids in expanding demands for Fish.....	\$	10,620 40
Educational Work.....		583 23
Fisheries Intelligence Bureau.....		487 03
Advertising.....		5,976 53
Miscellaneous.....		6,805 18
	\$	24,572 37

*Fisheries Research Board of Canada*

(OPERATION AND MAINTENANCE)

## EXPENDITURE 1946-47

	From Vote	From Receipts	Total
	\$ cts.	\$ cts.	\$ cts.
Atlantic Biological Station—St. Andrews, N.B.....	184,523 54		184,523 54
Atlantic Experimental Station—Halifax, N.S.....	79,812 09		79,812 09
Gaspe Experimental Station—Grand River, P.Q.....	44,071 29		44,071 29
Herring Investigation, Atlantic.....	12,000 00*		12,000 00
Central Fisheries Research Station.....	17,060 40		17,060 40
North West Territories Investigation.....	18,592 59		18,592 59
Pacific Biological Station, Nanaimo, B.C.....	194,228 14	7,657 06	201,885 20
Pacific Experimental Station, Vancouver, B.C.....	76,970 41		76,970 41
Administration and General—			
Toronto Office (A. G. Huntsman).....	11,024 45		11,024 45
Atlantic Salmon Investigations.....	8,869 99		8,869 99
Travelling Expenses.....	6,931 93		6,931 93
Publications.....	7,670 18		7,670 18
Miscellaneous.....	2,607 98	3,852 91	6,460 89
	664,362 99	11,509 97	675,872 96

\*Refund of \$104.80 to be made to Fisheries Research Board in Fiscal Year 1947-48.

*Fisheries Research Board of Canada*

(CONSTRUCTION AND IMPROVEMENTS)

## EXPENDITURE 1946-47

Atlantic Biological Station—St. Andrews, N.B.....	\$	3,533 00
Gaspe Experimental Station—Grand River, P.Q.....		18,622 00
Pacific Biological Station—Nanaimo, B.C.....		30,810 77
	\$	52,965 77

*Pacific Halibut Treaty*

## DIVISIBLE EXPENDITURES AND RECEIPTS, 1946-47

Gross Expenditures	Canada's Share	United States' Share	Receipts from United States Government	Balance due from United States Government
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
51,291 89	25,775 10	25,516 79	2,213 49	23,303 30

*Pacific Salmon Treaty*

## DIVISIBLE EXPENDITURES AND RECEIPTS, 1946-47

Gross Expenditures	Canada's Share	United States' Share	Receipts from United States Government	Balance due from United States Government
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
77,904 95	39,043 24	38,861 71	12,221 56	26,640 15

*Pacific Salmon Treaty (Hell's Gate)*

## DIVISIBLE EXPENDITURES AND RECEIPTS 1946-47

Gross Expenditures	Canada's Share	United States' Share	Receipts from United States Government	Balance due from United States' Government
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
338,961 93	169,480 99	169,480 94	9,590 44	159,890 50

## EXPENDITURES MADE ON BEHALF OF OTHER GOVERNMENT DEPARTMENTS, 1946-47

## NATIONAL RESEARCH COUNCIL—

## Fisheries Research Board—

To cover salaries of two Technical Secretaries.....\$ 3,464 32

*Statement, in Connection with Expenditure Made in the Fiscal Year 1946-1947  
for Canned Salmon Purchased for the British Ministry of Food*

## 1945 Pack—

Balance purchased—2257 cases, Grade B-2, 1 lb. tins, 48 per case and 206 tins of samples various sizes and grades.

## Expenditure on above and on shipments released from storage:—

Fish.....	\$ 29,071 24	
Labelling.....	112 85	
Freight.....	944 28	
Storage and Insurance at 2%.....	788 82	
Miscellaneous (stripping labels, etc.).....	518 86	
	<u>\$</u>	31,436 05
Funds provided by British Ministry of Food.....		31,297 40
Amount charged to United Kingdom Settlement Account.....		138 65
	<u>\$</u>	31,436 05

*Statement, in Connection with Expenditure Made in the Fiscal Year 1946-1947  
for Canned Herring Purchased for the British Ministry of Food*

## 1945-46 Pack—

## WEST COAST—

Quantity purchased—87,717 cases ovals, 1 lb. tins—48 per case.

## Expenditure on above and on shipments released from storage:

Fish.....	\$ 231,321 60	
Freight.....	98,186 06	
Storage and Insurance at 4%.....	11,699 44	
Miscellaneous.....	2,133 32	
	<u></u>	343,340 42(a)

## EAST COAST—

Quantity purchased—395 cases Sardines, 100  $\frac{1}{4}$  lb. tins per case:

## Expenditure

Fish.....	\$ 2,231 75	
Freight.....	122 47	
	<u></u>	2,354 22
Funds provided by British Ministry of Food.....	\$ 370,423 52	
Amount charged to United Kingdom Settlement Account...	24,728 88(b)	
	<u>\$</u>	345,694 64

(a) A cheque for \$184,034.32 covering a refund on canned herring was received from the Ministry of Food but this item does not appear in the net expenditure shown in the ledger account as both a debit and credit entry were required. Therefore, the expenditure, shown in the ledger, which is \$527,374.74, is larger by the amount of the cheque than the actual expenditure, which, as shown herein, is \$343,340.42.

(b) The ledger account shows a debit balance of \$16,488.00. A cheque for that amount was drawn to transfer an incorrect credit from United Kingdom Settlement Account to the British Ministry of Food. (A refund of \$41,216.88 was originally credited to United Kingdom Settlement Account instead of the correct amount due—\$24,728.88, thus necessitating the transfer noted above).

## DEPARTMENT OF FISHERIES

## FISHERIES EXPENDITURES, 1946-47, BY PROVINCES

Appropriation	General	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	British Columbia	Northwest Territories	Yukon Territory	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Salaries and Disbursements, Fisheries Officers and Guardsmen.....		263,738 81	75,076 23	188,450 39			19,222 34	221,171 35		37 88	767,697 00
Fisheries Patrol Service.....		35,718 15	13,844 72	36,150 67				343,415 13			429,128 67
Fisheries Protection Service.....		107,551 08						291,259 97			398,811 05
Building Fishways and Clearing Rivers.....	101 85	1,233 87		917 16				2,377 62			4,630 50
Edmund Extension Service.....	20,952 27	263 04			607 41	2,047 05		702 60			24,572 37
Fish Culture.....	14,828 00	129,056 61	13,308 58	64,356 54							221,579 73
Oyster Culture.....	309 07	7,410 84	15,778 15	810 49							24,308 55
Fisheries Research Board of Canada— Operation and Maintenance.....	37,104 53	88,690 07	22,627 78	165,017 78	44,071 29		17,080 40	271,108 55	18,492 59	100 00	664,362 99
Fisheries Research Board of Canada— Construction and Improvements.....			3,533 00		18,622 00			30,810 77			52,965 77
International Fisheries Comm. (Halibut). Grant to United Maritime Fishermen.....		1,000 00	1,000 00	1,000 00				25,775 10			25,775 10
Harbour Seal Bounty.....		6,195 00	1,285 00	1,805 00				12,675 00			21,960 00
International Pacific Salmon Comm.....								39,043 24			39,043 24
Fishing Bounty.....		82,003 20	10,910 45	20,961 65	46,112 55						159,992 55
International Pacific Salmon Fisheries Comm. (Hell's Gate) Expenses re Pelagic Seal Skins.....	419,885 34							169,480 99			169,480 99
Extension of Educational Work in Co-operative Producing and Selling among Fishermen.....		22,852 91	5,346 73	8,795 70	13,033 48			4,851 41			419,885 34
Construction of a vessel for experimental fishing for Herring and Mackerel.....		14,219 79	14,219 78	14,219 79							54,880 23
Expenses of Fisheries Technologist in Japan and of Observer at Meetings of International Council at Stockholm, Sweden.....											42,659 36
Demobilization and Reconversion— Assistance in Construction of Vessels of the Dragger Type and Conversion of Fishing Schooners to Dragners.....	3,764 36										3,764 36
Construction of Fishermen's Floats, Prince Rupert, B.C.....		29,271 99	29,271 98	29,271 99							87,815 96
Salt Fish Export Regulations (Admin.).....			1,411 44					22,451 37			22,451 37
Administration Canned Fish Regulations.....	859 52	9,954 96	1,411 45	1,411 45	2,592 16						16,229 53
Interest Charges on Purchase of 1945 Canned Salmon Pack for British Government.....	3,599 40	1,754 84	1,754 84	1,754 84	154 17						9,018 09
Salmon Pack for War Damage to Fishing Boats.....								2,300 93			2,300 93
Compensation for War Damage to Fishing Boats.....			1,320 00								1,320 00
Departmental Administration.....	158,526 43										158,526 43
Minister of Fisheries Salary and Car Allowance.....	12,000 00										12,000 00
Miscellaneous Civil Service Gratuities.....	994 00										994 00
(a) Atlantic Herring Investigation.....		19,825 34	19,825 34	19,825 34							59,476 02
(b) United Kingdom General Settlement Account.....								24,500 23			24,500 23



Provinces of British Columbia—Fisheries Research Board:									
(c) Herring and Pichard Investigation.....								1,339 16	1,339 16
(c) Shellfish Investigation.....								271 04	271 04
(c) Scale Collection, etc.....								82 73	82 73
	672,924 77	822,065 50	229,194 02	554,778 79	125,103 06	2,047 05	30,282 74	1,414,616 73	3,875,733 13
(d) Government of the United Kingdom—Fisheries Loans and Advances.....									401,720 92
(e) Pacific Halibut Treaty.....									23,303 30
(e) Pacific Salmon Treaty.....									26,640 15
(e) Pacific Salmon Treaty (Hell's Gate).....									159,890 50
									4,487,288 00

NOTE.—(a) Expenditure made on Account of the Atlantic Herring Investigation was \$59,476.02, of which \$11,895.20 was made through the Fisheries Research Board (Vote 82) the balance of \$47,580.82 being charged to various Provinces of the Dominion and Newfoundland.  
 (b) Purchase of Fish by the British Government. Credit of \$24,590.23 due to refund received for fish purchased in previous fiscal year.  
 (c) Balance due by the Province of British Columbia at the close of Fiscal Year 1946-47 on account of Divisible Expenses.  
 (d) Purchase of Fish by the British Government for which payment received through United Kingdom Payments Office.  
 (e) Balance due by the United States Government at the close of Fiscal Year 1946-47 on account of Divisible Expenses.

*Department of Fisheries*STATEMENT SHOWING THE ANNUAL EXPENDITURE OF THE DOMINION GOVERNMENT ON  
ACCOUNT OF FISHERIES SERVICE SINCE CONFEDERATION

Year	Fish Inspection, etc.	Fish Culture	Fisheries Research Board	Dev. V.D.S. Fish., etc.	Fishing Bounty	Sundry Services	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
To 1945-46 (a)...	38,938,115 30	12,289,537 77	5,469,992 98	2,509,162 67	10,146,019 42	76,680,897 31	146,033,725 45
1946-47.....	1,595,636 72	221,579 73	728,838 73	24,572 37	159,992 85	1,156,622 70	3,887,243 10
Total....	40,533,752 02	12,511,117 50	6,198,831 71	2,533,735 04	10,306,012 27	77,837,520 01	149,920,968 55

(a) For details by fiscal years see Appendix No. 8 of the Departmental Report for 1945-46.

*Department of Fisheries*STATEMENT SHOWING THE ANNUAL EXPENDITURE OF THE DOMINION  
GOVERNMENT ON ACCOUNT OF FISHERIES SINCE CONFEDERATION

## SUMMARY BY PROVINCES

General.....	\$ 8,375,701 08
Nova Scotia.....	28,155,699 78
Prince Edward Island.....	4,316,925 37
New Brunswick.....	13,181,696 64
Quebec.....	8,939,341 20
Ontario.....	4,215,369 24
Manitoba.....	1,893,154 68
Manitoba and North West Territories.....	24,771 76
Northwest Territories.....	140,868 59
Saskatchewan.....	580,086 15
Alberta.....	641,689 70
British Columbia.....	79,423,014 68
Yukon.....	32,649 68
	<b>\$ 149,920,968 55</b>

*Department of Fisheries*STATEMENT SHOWING THE REVENUE COLLECTED ANNUALLY BY THE  
DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES  
SERVICE SINCE CONFEDERATION

Year	Fisheries Revenue and Fines and Forfeitures	Casual Revenue	Pelagic Sealing Revenue	Sundry Revenue	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
To 1945-46 (a).....	6,185,829 56	289,623 67	3,902,557 14	5,234,585 53	15,612,595 90
1946-47.....	84,053 69	21,464 27	866,721 27	921 06	973,160 29
Total.....	6,269,883 25	311,087 94	4,769,278 41	5,235,506 59	16,585,756 19

(a) For details by fiscal years see Appendix No. 8 of the Departmental Report for 1945-46.

*Department of Fisheries*STATEMENT SHOWING REVENUE COLLECTED BY THE DOMINION  
GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE  
CONFEDERATION

## SUMMARY BY PROVINCES

General.....	\$ 9,613,838 70
Nova Scotia.....	899,903 43
Prince Edward Island.....	225,213 13
New Brunswick.....	773,768 18
Quebec.....	359,612 66
Ontario.....	561,204 84
Manitoba.....	335,947 06
Manitoba and Northwest Territories.....	7,416 45
Northwest Territories.....	11,187 78
Hudson Bay District.....	1,192 88
Saskatchewan.....	95,152 41
Alberta.....	234,710 87
British Columbia.....	3,446,628 05
Yukon.....	19,979 75
	<u>\$16,585,756 19</u>





## See Erratum slip on title page

## STATEMENT No. 1—ANNUAL CANNED SALMON PRODUCTION IN BRITISH COLUMBIA—1937-1946

Year	Number of can-neries oper-ated	Number of salmon licences issued					Packed canned									
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	Totals
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases
1937	37	6,095	3,162	291	9	5	325,774	10,963	1,788	3,420	19,236	844	113,972	585,576	447,602	1,509,175
1938	38	7,125	3,453	300	9	5	447,453	10,276	2,322	2,933	27,417	1,035	273,706	400,876	541,812	1,707,830
1939	35	6,502	3,947	339	9	5	269,888	10,302	2,848	2,947	48,209	797	196,887	620,595	386,584	1,539,057
1940	38	6,392	3,222	350	9	5	366,403	11,868	2,856	3,017	23,277	1,205	201,467	213,911	643,443	1,467,227
1941*	26	5,502	3,080	333	9	5	455,297	71,794	3,911	28,771	30,027	3,454	361,380	427,766	920,470	2,248,870
1942	30	6,382	3,878	312	9	5	666,571½	11,197½	3,826	9,721	23,265½	4,649	187,873½	270,622½	633,834	1,811,560½
1943	30	6,043	4,346	290	9	5	164,889	4,171½	2,199	4,287½	14,059½	3,095	171,983	530,188½	363,347½	1,258,221½
1944	30	5,426	4,483	293	10	5	247,714	3,633½	2,368	13,330½	12,464	3,926½	169,082½	389,692	255,316½	1,097,557½
1945	29	5,646	4,764	312	9	5	329,001½	3,666½	2,686	6,447½	6,670	2,922	212,217	825,512½	350,188	1,739,311
1946	31	7,346	5,727	348	9	5	543,027	3,912½	1,305	2,823	2,914	4,115½	97,240½	116,607½	576,133½	1,348,138½

\* Does not include salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:—

.....	8	31	1,079	.....	39,104	.....	6,339	46,561
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NOTE.—Licences issued include transfers from one district to another, except in the case of purse-seines.

## DEPARTMENT OF FISHERIES

STATEMENT No. 2—PACK OF CANNED SALMON ON THE NAAS RIVER—1937-1946

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued				Packed canned								Totals			
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye		Red Spring	Pink Spring	White Spring	Blue-back	Steel-head		Coho	Pink	Chum
							cases	cases									
*1937	2	321					17,590	773	245	232		46	12,336	7,876	10,530	49,628	
†1937							11,630	773	245	232		46	316	5,688	6,009	24,939	
*1938	2	309					21,746	458	189	125		188	20,485	61,660	15,135	119,986	
†1938							14,795	13	165	125		188	3,986	29,843	6,804	55,919	
*1939	2	289					24,425	170	389	149		15	3,209	29,819	2,615	60,791	
†1939							18,834	17	297	137		15	1,667	19,479	1,784	42,230	
*1940	2	254					13,810	1,258	181	275		120	11,447	29,893	5,461	62,445	
†1940							8,056	118	95	99		117	1,975	12,151	2,149	24,750	
*1941	2	281					24,876	133	187	207		377	14,430	23,274	5,971	69,455	
†1941							14,221	16	125	147		147	6,711	12,570	1,757	35,694	
*1942	2	328					24,461	496	366	255		619	21,008	54,038	12,691	113,934	
†1942							11,415	46	202	159		155	9,804	24,693	5,794	52,268	
*1943		167					13,413	422	386	194		334	9,769	17,670	10,156	52,344	
†1943							13,318	334	179	109		318	7,324	34,707	10,155	66,445	
*1944	1	186					2,081	73	32	32		23	389	14,375	2,423	19,997	
†1944							9,751	145	30	34		107	3,980	36,167	4,528	54,743	
*1945	1	158					4,479	46	45	19		45	1,277	18,855	1,676	26,378	
†1945							12,511	238	141	93		134	4,239	7,147	13,810	38,313	
*1946		171															
†1946																	

\* Pack of fish caught at Naas River regardless where canned.  
 Note.—Licences issued, include transfers from other districts.

† Pack of Naas River regardless where caught.

STATEMENT No. 3.—PACK OF CANNED SALMON ON THE SKEENA RIVER—1937-1946

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned									
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	Totals
†1937	7	850					55,811	3,788	382	315		21	34,502	72,455	37,431	204,705
†1937							41,023	3,704	382	315		21	14,573	57,023	10,027	127,068
†1938	6	1,049					73,508	3,361	1,105	259		42	100,658	146,676	34,785	360,454
†1938							46,988	2,916	1,141	259		42	38,542	69,299	14,668	173,855
†1939	6	844					96,358	3,277	1,438	348		55	48,973	127,521	15,666	293,686
†1939							68,388	3,124	1,396	336		55	27,115	91,559	6,360	198,333
†1940	7	926					133,854	5,884	1,113	571		133	62,516	91,612	62,114	359,797
†1940							116,505	4,708	1,017	396		130	19,196	46,087	4,684	193,323
†1941	7	981					110,544	4,695	703	448		2,261	126,557	73,896	54,357	373,461
†1941							81,183	3,929	641	368		1,890	45,891	51,389	12,139	197,429
†1942	6	775					57,539	5,850	874	832		3,670	70,384	146,322	31,481	316,952
†1942							29,976	5,305	699	617		3,117	36,395	47,819	10,611	134,539
†1943	8	749					51,476	1,443	838	623		2,323	63,638	122,040	57,579	299,961
†1943							28,259	964	440	379		1,953	40,280	53,203	6,407	131,886
†1944	8	725					92,203	1,176	664	289		2,724	38,159	190,872	87,071	413,159
†1944							67,855	897	468	193		2,395	18,809	45,833	7,172	143,623
†1945	7	787					117,859	1,324	827	389		1,612	51,904	211,140	44,104	429,160
†1945							103,939	1,208	785	363		1,538	33,672	69,148	9,121	219,773
†1946	7	877					72,318	1,864	579	551		2,523	38,534	50,799	81,633	248,802
†1946							52,928	1,591	438	410		2,358	26,281	10,737	11,161	105,904

† Pack of fish caught at Skeena River regardless where canned.

‡ Pack at Skeena River regardless where caught.

NOTE.—Licences issued include transfers from other districts.

STATEMENT No. 4—PACK OF CANNED SALMON FROM FISH CAUGHT AT RIVERS INLET AND SMITHS INLET—1937-1946

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued				Packed canned									
		G.N. Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	Totals
1937.....	6	1,875	.....	.....	.....	108,170	377	396	235	.....	75	6,374	7,973	18,394	142,494
1937.....	.....	.....	.....	.....	.....	91,399	335	452	233	.....	76	5,931	18,873	21,931	138,631
1938.....	6	2,261	.....	.....	.....	122,093	744	181	339	.....	169	17,527	10,827	15,832	167,732
1938.....	.....	.....	.....	.....	.....	86,490	716	316	351	.....	99	14,284	12,447	17,102	131,635
1939.....	4	1,817	.....	.....	.....	71,068	412	206	329	.....	133	16,125	24,580	7,437	110,296
1939.....	.....	.....	.....	.....	.....	36,937	285	32	306	.....	82	6,902	19,256	4,903	68,103
1940.....	4	1,896	.....	.....	.....	89,142	810	238	320	21	91	12,744	4,085	15,167	122,618
1940.....	.....	.....	.....	.....	.....	48,335	494	101	294	.....	40	7,452	4,315	2,369	63,600
1941.....	2	1,355	.....	.....	.....	115,342	1,006	148	667	.....	179	25,165	5,558	23,203	171,268
1941.....	.....	.....	.....	.....	.....	50,258	621	78	533	.....	104	16,067	6,193	6,236	80,133
1942.....	1	1,505	.....	.....	.....	95,023	745	104	144	.....	60	16,280	1,481	21,364	129,240
1942.....	.....	.....	.....	.....	.....	24,623	577	82	139	.....	19	6,189	1,446	10,295	43,860
1943.....	1	1,449	.....	.....	.....	66,855	223	591	208	.....	135	12,270	16,093	17,376	113,751
1943.....	.....	.....	.....	.....	.....	13,301	72	437	64	.....	25	6,596	23,347	15,892	59,734
1944.....	1	1,090	.....	.....	.....	40,859	107	623	140	.....	88	14,843	6,280	5,205	68,145
1944.....	.....	.....	.....	.....	.....	8,969	16	568	94	.....	64	9,625	11,863	2,530	33,679
1945.....	1	1,167	.....	.....	.....	101,791	154	708	204	.....	354	18,034	12,369	20,515	154,129
1945.....	.....	.....	.....	.....	.....	24,211	26	449	88	.....	110	12,451	22,390	19,393	79,393
1946.....	1	1,517	.....	.....	.....	87,190	570	248	335	.....	347	9,452	1,876	45,521	145,541
1946.....	.....	.....	.....	.....	.....	16,574	462	94	80	.....	87	5,96	855	31,435	55,001



## STATEMENT No. 5—PACK OF CANNED SALMON IN THE FRASER RIVER DISTRICT—1937-1946

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned									Totals
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases
1937†							66,583	3,622	84	1,738	1,354	15	11,242	87,897	20,934	193,469
1938*		2,319	190	112			217,882	4,592	413	1,532	21,923	72	54,314	29,862	181,444	512,034
1938†							169,430	3,754	32	508		13	28,687	63	49,835	252,322
1939*	10	2,161	210				73,216	5,092	475	1,511	32,833	86	48,120	204,681	143,020	509,034
1939†							43,294	4,466	448	1,094	8,428	69	17,144	108,608	42,480	225,986
1940*	10	2,237	212				121,080	4,036	311	1,042	13,627	178	47,397	13,243	178,860	379,774
1940†							86,215	3,411	279	770		144	12,369	12	40,056	143,256
1941†	11	2,025	195				149,716	7,132	1,285	25,507		248	28,260	102,799	90,274	405,221
1941*							196,871	8,290	1,425	26,396	18,466	315	91,571	179,071	360,623	883,028
1942†	12	2,754	406				418,491	2,396	324	6,982		314	10,559	136	82,586	521,788
1942*							474,035½	2,856	688	7,552	22,999½	314	34,004	9,075	264,736	816,260
1943†	11	2,613	484				28,938	1,059½	237½	2,181½		246	8,391	30,394	53,954	125,401½
1943*							72,507	1,393½	646½	2,852½	14,059½	291	38,747	162,495½	127,450	420,441½
1944†	10	2,582	530				85,656½	607½	469	11,499	52	293	15,708½	130	13,875½	128,291
1944*							107,431	1,172	947	12,196	12,303	332	46,928	33,756	50,421	265,486
1945†	10	2,706	520				77,412½	723½	621	3,891½	44	204½	15,160	100,572½	28,615	227,244½
1945*							123,384½	1,357½	1,195	5,437½	6,670	371½	60,536	285,351	117,044	601,347
1946†	13	3,738	525				307,854½	233½	131	659½		170	9,875	436	61,879	381,231
1946*							381,580	667	462	1,224½	2,870	311	18,374½	6,105½	134,601½	546,196

\* Represents actual pack, regardless where caught.

† Represents pack of Fraser fish, regardless where canned.

NOTE.—Licences issued include transfers from other districts. 1936† pack of Sockeye on Fraser, 164,408 cases, does not include 16,611 cases Sockeye caught on Fraser and exported and canned in Puget Sound canneries. 1940† pack of Sockeye on Fraser, 86,215 cases, does not include 4,536 cases Sockeye caught on Fraser and exported and canned in Puget Sound canneries. 1941: The above figures do not include packs of salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:

	Red Spring	Pink Spring	White Spring	Coho	Chums	Totals
1941 pack of 1940 catch.....	8	31	1,079	39,104	6,339	46,561

STATEMENT No. 6—PACK OF CANNED SALMON OF PUGET SOUND, U.S.A., FROM  
1937 TO 1946

Year	Number of canneries operated	Spring	Sockeye	Coho	Chum	Pink	Steelhead	Total
		cases	cases	cases	cases	cases	cases	cases
1937.....	14	8,968	60,259	32,559	17,417	327,833	.....	447,036
1938.....	13	2,787½	134,651	9,820½	7,852½	193	.....	155,304½
1939.....	14	2,439	43,511	54,773	14,505	275,485	.....	390,713
1940.....	9	1,991	63,890	30,478½	21,618	2,732	.....	120,718½
1941.....	9	4,706	110,605	45,968	21,170	153,686	.....	336,135
1942.....	10	1,460	263,458	6,582	3,896	710	.....	276,106
1943.....	10	2,872	19,116	26,219	224	61,479	.....	109,910
1944.....	3	1,178	37,509	475	15	306	.....	39,483
1945.....	4	3,733	53,054	18,958	158	307,940	.....	383,843
1946.....	19	8,367	268,561	11,523	43,843	92	.....	382,386

STATEMENT No. 7—STATEMENT OF HALIBUT LANDINGS—BRITISH COLUMBIA—  
1935-1946

(Includes landings in United States bottoms)

1935.....	171,143
1936.....	168,121
1937.....	187,425
1938.....	193,488
1939.....	227,188
1940.....	239,043
1941.....	229,658
1942.....	243,915
1943.....	250,034
1944.....	189,248
1945.....	194,763
1946.....	228,739

\* Figures for earlier years may be found in the annual report for 1940-41.

## STATEMENT No. 8—CANNED PILCHARD PACK—BRITISH COLUMBIA—1935-1946

	Cases		Cases
1935.....	27,184	1941.....	58,038
1936.....	35,007	1942.....	46,451
1937.....	40,975	1943.....	101,356
1938.....	69,374	1944.....	94,164
1939.....	7,300	1945.....	78,854
1940.....	59,166	1946.....	4,359

NOTE.—For earlier figures see Departmental report for 1940-41.

STATEMENT No. 9—PRODUCTION FISH OIL AND MEAL—BRITISH COLUMBIA—  
1935-1946

Year	From Pilchards		From Herring		From Whales			From Other Sources*	
	Meal and fertilizers	Oil	Meal	Oil	Whale- bone and meal	Fertil- izer	Oil	Meal and fertilizer	Oil
	tons	gals.	tons	gals.	tons	tons	gals.	tons	gals.
1935....	8,681	1,649,392	5,262	306,767	211	354	426,772	2,147	247,437
1936....	8,715	1,217,097	10,985	782,499	332	687	763,740	3,148	335,969
1937....	8,483	1,707,276	14,427	1,283,658	268	527	662,355	2,720	294,546
1938....	8,891	2,195,850	9,624	929,158	273	490	543,378	2,491	228,157
1939....	906	178,305	16,462	1,366,607	.....	.....	.....	3,004	283,504
1940....	4,853	877,556	24,264	1,700,819	181	434	361,620	3,526	285,314
1941....	10,473-2	1,789,708	8,757-5	584,157	271	577	566,505	5,081-6	390,939
1942....	11,550	1,622,840	10,898	643,577	130	205	255,556	4,837	263,481
1943....	15,456-4	2,233,281	7,126-5	675,002	62	90	134,553	2,315-9	156,880
1944....	10,278	1,962,040	8,832	889,213	.....	.....	.....	1,675-25	131,507
1945....	5,939-8	1,161,564	12,976-45	1,122,432	.....	.....	.....	1,676-8	159,603
1946....	673-1	74,612	8,463-5	847,232	.....	.....	.....	1,429-5	172,840

\* Salmon and halibut offal, gray fish, and anchovies.

## STATEMENT No. 10—NUMBER OF WHALES LANDED—BRITISH COLUMBIA—1935-1946\*

Species	1935	1936	1937	1938	1940	1941	1942	1943
Sperm.....	175	311	265	252	126	233	130	69
Sulphur.....	6	3	1	4	2	1	1	
Fin.....	20	48	44	50	90	67	25	15
Hump.....	1	14	7	4	2	27	7	7
Sei.....		2						
Totals.....	202	378	317	310	220	328	163	91

\* No whaling plants operated in 1939, 1944, 1945 and 1946.

## STATEMENT No. 11—STATEMENT OF LICENCES ISSUED FOR SALMON CANNERIES AND SALMON FISHING GEAR (NOT INCLUDING LICENCES TO CAPTAINS AND ASSISTANTS ON SALMON SEINE-BOATS OR ASSISTANTS ON SALMON GILL-NET BOATS) BRITISH COLUMBIA—1935-1946

Kind of Licence	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946
<i>District No. 1—</i>												
Salmon cannery.....	10	11	10	10	10	11	12	11	10	10	13	
Salmon purse-seine.....	124	118	190	190	210	212	195	400	484	530	520	525
Salmon gill-net.....	1,663	1,784	2,082	2,319	2,161	2,237	2,025	2,670	2,613	2,582	2,706	3,738
<i>District No. 2—</i>												
Salmon cannery.....	26	27	20	22	18	20	17	14	14	15	12	12
Salmon purse-seine.....	102	99	82	100	98	131	95	105	87	94	105	144
Salmon drag-seine.....	9	9	9	9	9	9	9	9	9	10	9	9
Salmon trolling.....	930	964	916	958	863	737	791	706	903	876	980	1,262
Salmon gill-net—												
Lowe Inlet.....	58	74	76	80	135	106	61	25	83	91	35	44
Naas River.....	310	349	321	309	289	254	281	170	199	186	158	171
Skeena River.....	1,053	970	856	1,049	844	926	981	765	749	725	787	877
Rivers Inlet.....	1,699	1,802	1,490	1,796	1,550	1,518	1,070	640	1,211	948	1,022	1,281
Smiths Inlet.....	324	408	385	465	267	378	285	107	238	142	145	236
Bella Coola.....	268	265	261	242	216	192	161	155	194	175	192	153
Butedale.....	41	57	18	80	102	148	78	3	88	72	76	131
Namu.....	129	146	137	159	148	11	93	109	89	81	96	141
Queen Charlotte Islands.....		24	4	53	9	14	8	42	8	34	11	9
Total, salmon gill-net, District No. 2.....	3,882	4,095	3,548	4,233	3,560	3,670	3,108	2,016	2,859	2,454	2,522	3,043
<i>District No. 3—</i>												
Salmon cannery.....	7	8	7	6	7	8	8	4	5	5	6	6
Salmon trap-net.....	8	7	5	5	5	5	5	5	5	5	5	5
Salmon purse-seine.....	191	188	209	200	241	219	238	207	203	199	207	204
Salmon drag-seine.....												
Salmon trolling.....	2,053	2,429	2,056	2,305	2,874	2,273	2,094	2,737	2,959	3,077	3,264	3,940
Salmon gill-net.....	673	741	466	673	781	485	459	567	571	390	418	565
<i>Whole Province—</i>												
Salmon cannery.....	43	46	37	38	35	38	36	30	30	30	29	31
Salmon trap-net.....	8	7	5	5	5	5	5	5	5	5	5	5
Salmon purse-seine.....	293	287	291	300	339	350	333	312	290	293	312	348
Salmon drag-seine.....	9	9	9	9	9	9	9	9	9	10	6	9
Salmon trolling.....	3,107	3,511	3,162	3,453	3,947	3,222	3,080	3,843	4,346	4,483	4,764	5,727
Salmon gill-net.....	6,218	6,620	6,096	7,125	6,502	6,392	5,052	5,253	6,043	5,426	5,646	7,346

NOTE.—Salmon cannery licences shown above were issued by the Provincial Fisheries Department.

STATEMENT No. 12—PACK OF SOCKEYE SALMON FROM RUNS TO FRASER RIVER,  
1935-1946

Year	Fraser River	Canadian Traps in Juan de Fuca Straits	Puget Sound Pack	Total Cases*
1935.....	57,212	5,610	54,677	117,499
1936.....	164,408	3,837	59,505	227,750
1937.....	66,583	6,152	60,259	132,994
1938.....	169,430	3,784	139,173	312,387
1939.....	43,249	4,290	43,511	91,050
1940.....	86,215	2,247	63,890	152,352
1941.....	149,715½	9,563	110,605	269,883½
1942.....	418,491	8,488	263,458	690,437
1943.....	28,938	1,339	19,116	49,393
1944.....	85,656½	2,494	37,509	125,659½
1945.....	77,412½	2,369	53,054	132,835½
1946.....	307,854½	19,765	268,561	596,180½

\* Figures represent pack of Fraser River sockeye, regardless where canned.

STATEMENT No. 13—STATEMENT SHOWING PACKS OF CANNED SALMON, 1935-1946  
WITH QUANTITIES GRADED SECOND QUALITY AND PERCENTAGES

—	Sockeye	Spring	Steel- head	Blue- back	Coho	Pink	Chum	Total
1935 Pack cases...	350,444	21,920	596	15,319	216,173	514,966	409,604	1,529,022
Grade B, cases...	3,435	659			3,840	20,528	5,601	34,063
Per cent.....	980	3-006			1-776	3-986	1-367	2-227
1936 Pack, cases...	415,024	29,845	1,068	33,718	212,343	591,532	597,487	1,881,026
Grade B, cases...	13,725				483	29	5,265	19,502
Per cent.....	3-307				-227	-005	-881	1-036
1937 Pack, cases...	325,774	16,171	844	19,236	113,972	585,576	447,602	1,509,175
Grade B, cases...	65				68	27,282	3,212	30,627
Per cent.....	-019				-059	4-659	-717	2-029
1938 Pack, cases...	447,453	15,531	1,035	27,417	273,906	400,876	541,812	1,707,830
Grade B, cases...	16,361			56½	1,111	1,413	1,583	20,524½
Per cent.....	3-656			-206	-405	-352	-292	1-201
1939 Pack, cases...	269,888	16,097	797	48,209	196,887	620,595	386,584	1,539,057
Grade B, cases...	3,444½	11	20	17	142½	45,667	1,068	50,370
Per cent.....	1-276	-068	2-509	-035	-072	7-358	-276	3-272
1940 Pack, cases...	366,403	17,741	1,205	23,277	201,467	213,911	643,443	1,467,227
Grade B, cases...	1,778½	57		13	461	2,530	3,208½	8,138
Per cent.....	-485	-321		-054	-228	1-182	-512	-554
1941 Pack, cases...	445,297	50,476	3,454	30,027	361,380	427,766	920,470	2,248,870
Grade B, cases...	1,186½	152½	2	33	539½	64,866	25,161½	91,941
Per cent.....	0-260	0-301	0-057	0-109	0-149	15-163	2-733	4-088
1942 Pack.....	666,571½	24,744½	4,649	23,265½	187,873½	270,622½	633,834	1,811,560½
Grade B, cases...	39,753½	256		87	693½	8,676	17,654	67,120
Per cent.....	5-963	1-034		0-373	0-369	3-205	2-785	3-705
1943 Pack.....	164,889	10,658	3,095	14,059½	171,983	530,188½	363,347½	1,258,221½
Grade B, cases...	227½	69			3	25,837½	7,823	34,760
Per cent.....	-137	-647			-002	4-873	2-153	2-762
1944 Pack, cases...	247,714	19,362	3,926½	12,464	160,082½	389,692	255,316½	1,097,557½
Grade B, cases...	723	101	1½		86	2,777	1,238½	4,927
Per cent.....	0-292	0-521	0-038		0-050	0-712	0-485	0-448
1945 Pack, cases...	329,901½	12,800	2,922	6,670	212,217	825,512½	350,188	1,739,311
Grade B, cases...	163	99			30	75,284½	4,474	80,050½
Per cent.....	0-049	0-773			0-014	9-119	1-277	4-602
1946 Pack, cases...	543,027	8,100½	4,115½	2,914	97,240½	116,607½	576,133½	1,348,138½
Grade B, cases...	1-313					2,924	1,245	5,482
Per cent.....	0-241					2-078	0-606	0-406



DOMINION OF CANADA

EIGHTEENTH

ANNUAL REPORT

OF THE

**DEPARTMENT OF FISHERIES**

EIGHTY-FIRST ANNUAL FISHERIES REPORT  
OF THE DOMINION

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FOR THE YEAR

1947-48



OTTAWA  
EDMOND CLOUTIER, C.M.G., B.A., L.Ph.,  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
CONTROLLER OF STATIONERY  
1949



*To His Excellency Field Marshal the Right Honourable Viscount Alexander of Tunis,  
K.G., G.C.B., G.C.M.G., C.S.I., D.S.O., M.C., LL.D., A.D.C., Governor  
General and Commander-in-Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour herewith, for the information of Your Excellency and the Parliament of Canada, to present the Eighteenth Annual Report of the Department of Fisheries, being the Eighty-first Annual Fisheries Report for the Dominion.

I have the honour to be,

Your Excellency's most obedient servant,

JAMES A. MACKINNON,  
*Minister of Fisheries.*

DEPARTMENT OF FISHERIES,  
Ottawa, June 30, 1948.





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# REPORT OF THE DEPUTY MINISTER

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To The Honourable JAMES A. MacKINNON, M.P.,  
Minister of Fisheries.

SIR,—I have the honour to submit herewith the eighteenth Annual Report of the Department of Fisheries, which covers the fiscal year 1947-48 and is the eighty-first Annual Report on the fisheries of Canada.

The table includes the following:

- Reports of the Chief Supervisors of Fisheries for the Western, Eastern and Central Divisions respectively;
- Report of the Director of Fish Culture;
- Report on Oyster Culture and the Development of Oyster Farming;
- Reports on the Work of the Atlantic and Pacific Fish Inspection Laboratories, respectively;
- Report on Fur Seal Returns;
- Report of the Fisheries Engineer;
- Report of the Chief Treasury Officer of the Department;
- Review relating to the Fisheries Research Board of Canada by the Chairman, G. B. Reed, O.B.E., M.A., B.Sc., Ph.D., F.C.I.C., F.R.S.C.;
- Summaries touching, respectively, the Work of the International Pacific Salmon Fisheries Commission and the Work of the International Fisheries Commission.

## FISHERIES RESULTS IN 1947

The year 1947 brought to the fisheries the first repercussions of the return to peace-time conditions. While the world food situation generally remained one of short supply, the restoration of fishing operations by the principal European producing countries sharply reduced the pressure of demand on Canadian production. While generally strong, the United States market, which is of particular importance with respect to fresh and frozen forms of fish, showed certain weaknesses during the months of main production. The United States dollar shortage, which has forced many countries to restrict imports from the United States and Canada began, in 1947, to limit outlets for Canadian fishery products. Of particular importance in this regard was the decision of the United Kingdom and the Dominions of Australia and New Zealand to curtail drastically the imports of Canadian canned fish, particularly salmon.

Purchases by UNRRA continued to the end of June 1947 and were followed by the \$8 million purchase of fishery products as part of Canada's contribution to post-UNRRA distribution of foods to European countries. These purchases had a strengthening effect on the market generally and took care of most of the surpluses of fishery products over domestic and commercial export requirements.

Preliminary figures of Canadian landings in 1947 indicated a fairly substantial drop in production from 1946. The estimated total landings of the sea fisheries at 1,093 million pounds compares with 1,216 million pounds in 1946.

The principal reductions occurred in the Atlantic cod and herring fisheries. In the former, landings were down by 100 million pounds as a result of a labour dispute which halted deep sea operations during the first three months of the year and curtailed operations later in the season when market conditions and prices were unstable. The Atlantic herring fishery, at 125 million pounds, was 26 million pounds below the catch of 1946.

The Pacific Coast fisheries, on the other hand, enjoyed a generally good season, with substantial increases in landing from the important salmon, halibut and herring fisheries.

Prices of fishery products generally remained relatively strong throughout 1947. The wholesale index of fishery products which stood at 220.6 in January (1935-1939 equals 100) declined to 200.4 in May, but rose to 237.8 in December. Prices to fishermen were generally lower on the Atlantic Coast than in 1946 but were somewhat higher for most species of Pacific Coast fish.

Preliminary estimates of the landed value of the 1947 catch gives a total of \$48.7 million, as compared with the reported \$56.6 million in 1946. These figures represent gross income to fishermen from the sale of fish. Complete figures are not available on the landed value of the inland fisheries, although indications are that the 1947 total would be somewhat below that of 1946. On a regional basis, the landed values for the Atlantic Coast show a reduction from \$34.3 million in 1946 to \$23.1 million in 1947; while on the Pacific Coast the 1947 figure of \$25.6 million was above the \$22.2 million reported for 1946. The lower landings of cod and lobster, together with generally reduced prices, were mainly responsible for the reduced income to Atlantic Coast fishermen.

As to the disposition of the catch, perhaps the most significant development on the Atlantic Coast was the drop in the production of cod filets. A large part of the decrease in cod landings is accounted for in the reduced requirements of the filleting plants, the quantities of cod salted and canned showing slight increases. There was a substantial increase in the production of canned sardines, all of the output coming from the Atlantic Coast. On the Pacific Coast, the only significant change in disposition was an increase in the quantity of herring canned. The disposition of the salmon catch between the fresh markets and the canneries appears to have been fairly normal.

The total value of fisheries exports in 1947 at \$82,359,203 was 5 per cent lower than in 1946 when the figure was \$86,572,684. Decreases were noted in fresh and frozen groundfish, both round and filleted, and also in smoked and pickled groundfish. Exports of dried salt groundfish increased to the United States, Trinidad, British Caribbean Islands (except Jamaica), Cuba and other Caribbean and Latin American countries. There was a large increase in exports of fresh and frozen halibut to the United States and the same is true of fresh and frozen salmon. The United States took fewer fresh lobsters. Exports of inland fish to the same country also showed a decline.



Exports of pickled herring were only half those of 1946. Increases were noted in shipments to Barbados, Jamaica and the Leeward and Windward Islands. Relief shipments to Poland continued on a smaller scale and those to Czechoslovakia disappeared. Puerto Rico took only one-third as much pickled herring as in 1946 and the United States about one-half. Pickled mackerel followed the general trends of pickled herring.

Total exports of canned fish were valued at \$31,510,497. There was an increase of 1.9 per cent in quantity and of 3.5 per cent in value over 1946. Increases were recorded in clams, herring, sardines and other sea fish, while haddock, pilchards, salmon and lobsters declined.

The total value of fisheries products imported into Canada in 1947, approximately \$5 millions, was \$473,000 above the 1946 total. Value of cod imported from Newfoundland decreased, but imports from European sources began to figure more prominently in Canada's imports. Norwegian canned herring and sardines returned to the market after several years, reaching a value of \$685,000 for the year. Peru entered the Canadian market with canned tuna to the value of \$182,000. Imports from the United States, mainly canned shellfish—clams, crabs and shrimps—increased sharply, but imports of shelled oysters declined.

### DEPARTMENTAL DEVELOPMENT

In the course of the fiscal year further progress has been made in carrying forward the programme which was begun in 1946-47 for strengthening the Department's service as regards personnel, especially in positions of responsibility; improving physical equipment, such as patrol or protective vessels; and setting in motion additional activities in the interest of fisheries development or, in some instances, changing the emphasis or direction or method of existing undertakings. In net result, though some of the steps contemplated as part of the programme remain to be taken, the Department is now in substantially better position than heretofore to perform the duties placed upon it by Parliament.

In the report for 1946-47 some reference was made to the need for widening the Department's inspection services and to steps which were being taken to obtain trained additional officers. As was then pointed out, 135 war veterans had been selected to take a special course of training in order to qualify them as full-time fisheries inspectors. The course was arranged by the Department and the Vocational Training Branch of the Department of Labour, jointly. Following its completion (actually there was a course on each coast) approximately 130 appointees were selected from the successful candidates and assigned to duty, 40 in British Columbia, 90 in the Maritime Provinces. Taken as a group, these new officers are fitting well into the service and are showing a measure of efficiency which indicates the soundness of the training plan which was followed.

The duties of fisheries inspectors may perhaps be said to fall within two broad categories—enforcement of fisheries regulations, with a view to proper protection of the resources, and the performance of field administrative work generally, and second, the performance of 'quality control' duty through the inspection of plants and their operations and the inspection and grading of fisheries products. The

importance of this latter work is increasingly evident. Quality production is essential to growth in sales of Canadian fish and the returns from them. It is true, of course, that prime responsibility as to quality rests with the fishing industry itself. At the same time, it is also true that there is duty upon public authority, in the interest of the consumer and as an aid to the promotion of fisheries progress, to maintain efficient systems of inspection and grading which will make it sure that only products of satisfactory quality reach the market. It is the Department's intention, therefore, to build up a distinct service or division to carry on this 'quality control' work. In outline, the division will consist of the Pacific Canned Fish Inspection Laboratory, an expanded service in the inland area where whitefish inspection was instituted several years ago under joint arrangements between the Department and the Prairie governments, and a service on the Atlantic Coast separated from the purely administrative side of the departmental organization.

During the year the Department's water-borne units on the Pacific Coast were increased by commissioning two former Royal Canadian Mounted Police cruisers, after the installation of new engines. A 65-foot patrol boat, formerly in use in the armed services, was also put into commission. Two new patrol boats were purchased for the Atlantic Coast service; a third was bought but will not be ready for commissioning until 1948-49. The construction of several new patrol boats for Atlantic duty is planned for the coming year.

Formerly, the Department's work in the fish cultural field consisted almost wholly in the operation of a number of hatcheries and subsidiary establishments. A broader programme in this field is now planned, a programme of fish culture development as distinguished from hatchery operation alone. It has not yet been worked out in complete detail; the details, indeed, will be affected from time to time by requirements and opportunities as they present themselves. It will include, however, attention to such matters as stream improvement and management, the fertilization of waters, predator control. The fish cultural service is also taking over from the Department's field administration the major responsibility for control of pollution, the removal of stream obstructions, and the provision of fishways where they are found necessary. A divisional engineer is to be appointed on each coast and as one of his duties will be concerned with obstruction clearance and fishway construction.

STEWART BATES,

*Deputy Minister.*

## ANNUAL REPORT OF CHIEF SUPERVISOR OF FISHERIES (A. J. WHITMORE) WESTERN DIVISION (BRITISH COLUMBIA) FOR 1947

In marketed value the fisheries production in British Columbia for 1947 amounted to \$58,285,000, the highest annual valuation ever achieved, being \$13,755,000 in excess of the best previous year, 1945. Production of salmon again headed the various fisheries with a value of \$35,260,000; indeed this fishery accounted for much of the year's increase in showing a gain of \$10,914,000 over 1946. Fisheries in which the major valuations occurred are shown in the following statement:

	Marketed Value
Salmon.....	\$35,260,000
Herring.....	12,061,000
Halibut.....	5,943,000
Fish livers, etc.....	2,465,000

### SALMON

In volume the catch of salmon for 1947 came up to that of an average production year, with an over-all catch of 1,628,000 hundredweights. The pack in canned form of all varieties of salmon totalled 1,505,157 cases, as compared with 1,348,139 in 1946, and an average of 1,404,653 cases for the past five years, as shown in the undernoted table:

	Cases
1928-1932.....	1,484,861
1933-1937.....	1,553,444
1938-1942.....	1,764,221
1943-1947.....	1,404,653

Features in this year's salmon production included the excellent sockeye returns to Rivers and Smiths Inlets, the large pink catches in areas along the east coast of Vancouver Island, and the abundance of chum salmon in the Bella Bella, Bella Coola, and Butedale areas.

### SOCKEYE

The pack of sockeye, amounting to 286,109 cases, was somewhat below average. It was the cycle year for low returns of this variety to both the Skeena and Fraser rivers and the unexpectedly heavy run to the Rivers-Smiths Inlet areas was not sufficient to offset the low yields from the Fraser and Skeena. The following table shows the averages of five-year groups as since 1928. The Fraser pack amounted to 27,857 cases only, as compared with 307,854 cases in the previous year. This fishery was subject for the second year to special regulations of the International Pacific Salmon Fisheries Commission; because of its record of being the weakest cycle in the sockeye returns to this watershed, the regulatory measures were designed to particularly assure that the escapement for reproduction purposes was on a higher level than in the brood year. The Commission was highly successful in this objective.

The Skeena sockeye pack amounted to 32,511 cases, one of the lowest annual totals on record. At Rivers Inlet and Smiths Inlet, however, fine returns of sockeye were experienced, yielding in all some 175,629 cases, which has only been exceeded once in the records of this fishery, i.e., in 1925:

	Cases
1928-1932.....	307,669
1933-1937.....	345,446
1938-1942.....	441,122
1943-1947.....	314,225



## COHOES

A canned production of 139,620 cases was achieved, compared with an average of 150,401 cases in the past three seasons. The canned production, however, is now not a proper index of the volume of runs, inasmuch as there is varying demand from year to year for this variety of fish in other market forms. There has been marked improvement during the past few years in the prompt dressing, icing, handling and delivery to market of coho salmon, particularly in the case of the catches by trollers. This has resulted in a continued firm demand at attractive prices for the excellent product. While coho returns in District No. 3 were a good average, the returns in District No. 2 were disappointing and the catch by trollers was much less than usual. The following table shows the canned pack of cohoes by averages for each three-year period since 1933:

	Cases
1933-1935.....	183,112
1936-1938.....	200,007
1939-1941.....	253,171
1942-1944.....	176,313
1945-1947.....	150,401

## PINKS

A canned pack of 599,882½ cases of pinks was realized. While this did not match the record pink pack in the brood year of 1945, of 825,512½ cases, it is well above average in the record of the annual pink packs. The big return which was looked for in the Central area of District No. 2 from the large runs of 1945 did not materialize; an abundant supply of fish reached the spawning grounds in that year, and conditions throughout the hatching period appeared to be favourable; the reason for the poor return is not immediately available. On the other hand, favourable runs occurred in the Johnstone Straits area and other areas on the east coast of Vancouver Island, as well as to the Fraser River. The latter run was fished very intensively by United States fishermen in the Puget Sound area prior to reaching Canadian waters. The pink catch in those waters amounted to more than 10,000,000 fish, whereas the sharply restricted Canadian catch by fishermen of the Fraser River and in waters leading up to the Fraser was approximately 3,500,000. As is indicated in the accompanying summary of spawning ground conditions, it would appear that the reproduction needs may have suffered from this large commercial toll. The average annual packs since 1934 by two-year groups are shown hereunder:

	Cases
1934-1935.....	475,165
1936-1937.....	588,554
1938-1939.....	510,735
1940-1941.....	320,838
1942-1943.....	400,405
1944-1945.....	607,602
1946-1947.....	358,245

## CHUMS

There was a pack of 461,799 cases of canned chums, representing approximately 59% of the chum catch. The proportion of the catch being used for canning purposes is showing a steady decline, i.e., in 1945 the percentage used for canning was 71% and in 1946, 69%. Greater quantities are being used for fresh and frozen purposes, and in 1947, as related elsewhere in this report, a substantial amount was exported to the United States. The run of chums in District No. 2 was exceptionally good, particularly in the Central area. The runs to the areas on the west coast of Vancouver Island were disappointingly light, and it was found necessary to effect early closures of fishing in the interests of conservation. The annual average canned production by four year groups is as follows:



	Cases
1928-1931 .....	436,337
1932-1935 .....	380,795
1936-1939 .....	493,371
1940-1943 .....	641,858
1944-1947 .....	418,648

## INSPECTION OF CANNED SALMON

Results of the year's inspection of canned salmon at the Department's Laboratory in Vancouver are as follows:

Number of inspections made .....	1,675
Total number of cases inspected .....	1,536,434 $\frac{3}{4}$
Number of cases below Grade "A" certificate standard .....	87,015 $\frac{1}{2}$
Total number of cases eligible for Grade "A" Certificate .....	1,449,419 $\frac{1}{4}$

## DETAILS OF INSPECTIONS ACCORDING TO SPECIES

Species	Number of cases inspected	Cases below Grade "A" Certificate Standard	Cases eligible for Grade "A" Certificate
Sockeye .....	285,241 $\frac{1}{4}$	6,090 $\frac{1}{2}$	279,150 $\frac{3}{4}$
Springs .....	9,551 $\frac{1}{2}$	35 $\frac{1}{2}$	9,516
Steelhead .....	3,202 $\frac{3}{4}$		3,202 $\frac{3}{4}$
Bluebacks .....	4,545 $\frac{3}{4}$	208	4,337 $\frac{3}{4}$
Coho .....	141,065	4,399 $\frac{3}{4}$	136,665 $\frac{1}{4}$
Pinks .....	601,443 $\frac{3}{4}$	73,358 $\frac{1}{2}$	528,085 $\frac{1}{4}$
Chums .....	491,384 $\frac{3}{4}$	2,923 $\frac{1}{4}$	488,461 $\frac{1}{2}$
Totals .....	1,536,434 $\frac{3}{4}$	87,015 $\frac{1}{2}$	1,449,419 $\frac{1}{4}$

## PARTICULARS OF SALMON BELOW GRADE "A" STANDARD ACCORDING TO SPECIES

Species	Below Grade "B"	Grade "B"	Tips and Tails	Minced, Flakes, etc.	Totals
Sockeye .....	73 $\frac{1}{2}$	706	2,824 $\frac{1}{2}$	2,486 $\frac{1}{2}$	6,090 $\frac{1}{2}$
Springs .....		4 $\frac{1}{2}$		31	35 $\frac{1}{2}$
Steelhead .....					
Bluebacks .....			32	176	208
Coho .....		7	1,477 $\frac{1}{2}$	2,915 $\frac{1}{4}$	4,399 $\frac{3}{4}$
Pinks .....		71,515	262	1,581 $\frac{1}{2}$	73,358 $\frac{1}{2}$
Chums .....		594	571 $\frac{1}{2}$	1,757 $\frac{3}{4}$	2,923 $\frac{1}{4}$
Totals .....	73 $\frac{1}{2}$	72,826 $\frac{1}{2}$	5,167 $\frac{1}{2}$	8,948	87,015 $\frac{1}{2}$

The report of the Chief Chemist covering the year's activities at the Laboratory will be found on page 50.

Salmon inspection fees collected at the rate of one-half cent per case amounted to \$7,747.86.

## DISPOSITION OF CANNED SALMON

During the war years the entire pack of British Columbia canned salmon was requisitioned for the Allied war effort, with limited amounts during later years being permitted for Canadian consumption. At the beginning of 1947, all Government distribution controls on canned salmon through the Department of Fisheries were dropped. Under arrangements between the British Ministry of Food and the salmon canners 40% of the 1947 pack was reserved for purchase for British Government purposes. The residue, however, was such that for the first time since 1940 there were adequate quantities of canned salmon available to meet Canadian domestic demands. The industry also for the first time in that period found itself with supplies for purposes of its own particular marketing in export fields.

## SALMON TAKEN BY INDIANS OF THE PROVINCE FOR PURPOSES OF THEIR OWN FOOD SUPPLIES, UNDER FREE PERMIT

—	Sockeye (fish)	Springs (fish)	Coho (fish)	Pinks (fish)	Chums (fish)	Steel- heads (fish)	Total (fish)
District No. 1 .....	38,514	4,080	3,118	5,385	4,260	1,022	56,379
District No. 2 .....	64,133	5,980	9,380	4,775	15,070	5,257	104,595
District No. 3 .....	7,866	4,553	4,000	4,200	57,950	300	78,869
Totals.....	110,513	14,613	16,498	14,360	77,280	6,579	239,843

## HALIBUT

Halibut fishing commenced on May 1st, under the regulations of the International Fisheries (Halibut) Commission, this being the opening date in effect for several years. Area No. 2, which includes the Convention waters off the coast of British Columbia, was closed on June 8th, after a season of 39 days only, by which time the catch quota for halibut set by the Commission for that area had been taken by the Canadian and United States fishing fleets. Area No. 3, which embraces Convention waters north and west of Cape Spencer in Alaska, and including the Gulf of Alaska, closed on August 17th, whereas in 1946 closure took place, after 111 days of fishing, on August 19th.

Total landings at all points in British Columbia aggregated 262,230 hundred-weights, the highest figure since 1929. This, in part, was due to cessation of fishing by a section of the United States fleet for almost half the season, resulting in a higher proportion of the annual catch quotas being taken by Canadian fishermen than would otherwise have been the case.

This fishery, which less than twenty years ago occupied specialized fleets and fishermen on an annual basis, has now evolved into a compressed seasonal operation, attracting fishermen and boats from every type of fishing. Extraordinary shore handling and cold storage facilities have been established to meet this developing contingency. The old halibut fleet and its fishermen in turn now find it necessary to penetrate other fisheries to make up their yearly earnings.

The following statement shows halibut landings at the several ports and areas in the province since 1930:

Year	Vancouver and New Westminster	Prince Rupert	Butedale- Namu Area	District No. 3	Totals
	(cwts.)	(cwts.)	(cwts.)	(cwts.)	(cwts.)
1930.....	11,387	239,617	978	2,814	254,796
1931.....	8,498	167,757	3,727	2,123	182,005
1932.....	11,883	148,615	6,677	1,672	168,847
1933.....	13,436	144,065	10,431	2,440	170,372
1934.....	16,113	150,476	13,297	2,716	182,602
1935.....	22,351	129,586	15,713	3,493	171,143
1936.....	20,777	131,830	11,522	3,992	168,121
1937.....	23,334	147,638	12,676	3,777	187,425
1938.....	28,155	141,691	17,776	5,866	193,488
1939.....	30,225	173,857	18,651	4,455	227,188
1940.....	26,010	185,921	23,157	3,955	239,043
1941.....	22,057	166,513	30,946	10,142	229,658
1942.....	30,547	180,789	21,638	10,941	243,915
1943.....	44,201	180,507	12,003	13,323	250,034
1944.....	30,779	133,744	12,356	12,369	189,248
1945.....	21,151	152,828	13,326	7,458	194,763
1946.....	15,970	186,896	17,493	8,380	228,739
1947.....	40,780	181,571	23,176	16,703	262,230

## HERRING

A tonnage of herring greater than in any previous year, i.e., 128,170, was caught during 1947. The herring runs to all principal producing areas were good. Unquestionably, recent aids in herring purse-seining contributed in substantial measure to the successful fishing season—depth finders, radiotelephones, navigational aids, etc. The catch-quota principle of regulation continued in effect for all of the main producing areas, with the exception of the west coast of Vancouver Island. Here, the scientific staff of the Pacific Biological Station, who have been engaged in a long-term investigation of the British Columbia herring fisheries, had indicated that the catch-quota arrangement did not appear to be serving as had been expected, and had asked that to assist further in the investigations the catch quotas for the west coast of Vancouver Island be dropped and that, except for minimum essential safeguards, unrestricted fishing be permitted. During January of 1947 large schools of herring were located in this area by the fishing fleet and the very large quantities caught materially assisted in swelling the provincial catch.

The marketed value of herring and by-products during the year amounted to \$12,061,000, also a new high total. There was a canned production of 1,411,636 cases with a marketed value of \$8,526,086, while the value of fish meal and oil derived from herring amounted to \$2,855,000. Production in canned form was stimulated by the large orders through Canadian Commercial Corporation, Ottawa, purchasing for European relief agencies. There is considerable speculation as to the future of the large herring canning activity which came into being as a result of the urgent demands arising out of the Allied war effort. Following the war, purchases for various world relief requirements have maintained the industry at a high level of production.

Details of the herring catch and of its utilization are as follows:

	Dist. No. 1	Dist. No. 2	Dist. No. 3	Total	Green Tons
Catch.....cwts.	2,847	436,987	2,123,569	2,563,403	128,170
PRODUCTION—					
Marketed fresh.....cwts.	4,893	35	807	5,735	286.75
Kippered.....cwts.	6,307	15	72	6,394	959.10
Bloatered.....cwts.	40		21	61	6.10
Canned.....cases	1,123,471	73,031	215,094	1,411,636	56,465.04
Kippered snacks.....cases	2,168			2,168	433.60
Frozen.....cwts.	4,350		860	5,210	260.50
Used for bait.....bbls.	10,819	26,135	12,004	48,958	4,895.80
Dry Salted.....cwts.	492	8,880	43,031	52,403	18,417.45
Scotch cured.....bbls.	210			210	42.00
Herring oil.....bbls.	2,127,508	1,413,150	5,042,526	8,583,184	
Herring offal oil.....lbs.	2,698,735	33,848	121,140	2,853,723	
Herring meal.....tons	1,739.05	1,313.45	6,263.75	9,316.25	46,403.26
Herring offal meal.....tons	2,110.25	135.50	202.75	2,448.50	
Salted.....cwts.			1,700	1,700	

The following table shows the canned herring pack from 1939 to 1947:

Year	Cases
1939.....	233,046
1940.....	727,292
1941.....	1,013,329
1942.....	1,540,918
1943.....	1,372,775
1944.....	1,130,527
1945.....	1,372,614
1946.....	1,317,707
1947.....	1,411,636

### HERRING INSPECTION

The following are detailed results of the year's inspection of canned herring at the Canned Fish Inspection Laboratory maintained by the Department of Fisheries in Vancouver:

Number of inspections made.....	488
Total number of cases inspected.....	1,497,244½
Total number of cases below Certificate standard.....	10,011
Total number of cases available for Certificates.....	1,487,233½



## DETAILS OF CANNED HERRING INSPECTIONS ACCORDING TO SIZES

Size	Number of cases inspected	Number of cases below certificate standard	Number of cases eligible for certificates
<i>Plain:</i>			
1-lb. Talls.....	395,461	3,104	392,357
1 lb. Ovals.....	713,883½		713,883½
½ lb. Ovals.....	2,700½		2,700½
Total.....	1,112,045	3,104	1,108,941
<i>Tomato Sauce:</i>			
1-lb. Talls.....	106,688	6,907	99,781
1-lb. Ovals.....	262,089		262,089
½-lb. Ovals.....	16,422½		16,422½
Total.....	385,199½	6,907	378,292½
Grand Total.....	1,497,244½	10,011	1,487,233½

## PARTICULARS OF HERRING BELOW GRADE "A" STANDARD ACCORDING TO SIZES

Size	Below Grade "B"	Grade "B"	Total
<i>Plain:</i>			
1-lb. Talls.....	548	2,556	3,104
<i>Tomato Sauce:</i>			
1-lb. Talls.....	422	6,485	6,907
Totals.....	970	9,041	10,011

Herring inspection fees collected, at the rate of one-half cent per case, amounted to \$8,900.46.

## PILCHARDS

The pilchard runs did not materialize, and notwithstanding extensive exploration by well equipped purse-seine boats, no pilchards whatever were secured in British Columbia offshore waters where formerly the main catches were taken. The entire catch for 1947 amounted to only 485½ tons, with a marketed value of \$41,750, this quantity being taken in Effingham Inlet, Barclay Sound area, being fish of large size commonly known as "homesteaders".

From available biological data covering the pilchard-sardine fisheries from California to British Columbia, apparently the stocks of mature fish are at a serious low level; and no prospect of immediate recovery of a pilchard fishery of former magnitude off the British Columbia coast. This diminution of the pilchard-sardine stocks common to the Pacific coast of the United States and Canada would appear to warrant early consideration and collaboration by appropriate agencies of the two Governments.

## DEPARTMENT OF FISHERIES

## GRAYFISH

The following statement shows details of this fishery for 1947 as compared with production for other years since 1940:

Year	*Licences issued	Liver landings	Average price to fishermen
		(lbs.)	(cents)
1940.....	406	1,566,500	6
1941.....	897	3,552,576	9
1942.....	1,233	4,241,286	16
1943.....	2,041	5,121,186	25
1944.....	3,052	7,769,574	34
1945.....	2,165	5,821,849	31
1946.....	1,405	2,844,217	31
1947.....	1,456	3,759,282	29

\* Licences do not include transfers.

There was some improvement in the volume of catch over 1946 but the total is still considerably below the averages for the years between 1942 and 1945.

## CLAMS

This fishery was again an active one and the canned pack, 34,225 cases, was the highest since 1934. The production as marketed fresh and processed in canned form in recent years is shown in the following table:

Year	Marketed Fresh (cwts.)	Canned (cases)
1938.....	42,169	22,155
1939.....	21,601	5,431
1940.....	20,785	7,151
1941.....	25,402	12,783
1942.....	8,278	17,808
1943.....	8,397	13,626
1944.....	9,869	12,474
1945.....	39,834	4,693½
1946.....	15,456	23,867
1947.....	* 9,523	34,225

\* Include frozen.

## TUNA

The volume of albacore tuna landed at British Columbia ports during the year was 796,500 pounds, with a marketed value of \$211,650, being the second highest since the first landings from this fishery were made nine years ago. The tuna fishermen received high prices for their catch, the highest for the year being \$610 per ton, as compared with a high of \$400 per ton in 1946. The catch was frozen on being landed and, with the exception of a quantity which was used to pack 560 cases in canned form, the entire catch was later exported to the United States for canning.

This fishery continues to be an uncertain one, notwithstanding that there is an improved fleet of boats specially designed and equipped for the rigors and needs of this offshore fishery. There is very little data concerning the life history, feeding habits, migratory field, etc., of the albacore tuna, to assist the fishermen who are prospecting this fishery; advantage should be taken of any favourable opportunity

presenting itself to aid in developing this fishery by securing additional data pertaining to tuna characteristics and movements.

The following statement shows the annual landings of tuna and marketed value since 1939:

Year	Quantity (cwt.s.)	Value (\$)
1939.....	2,838	14,190.00
1940.....	45	225.00
1941.....	760	6,840.00
1942.....	—	—
1943.....	288	5,760.00
1944.....	4,636	79,676.00
1945.....	14,287	297,983.00
1946.....	4,316	85,113.00
1947.....	7,965	211,650.00

#### ANCHOVIES

This fishery which has had commercial development only since 1939, again contributed a production having a marketed value of \$536,850. Practically the entire catch was processed in canned form. Further refinements in the canning technique were realized through collaboration between the two companies which have been specializing in this commodity and the scientific staff of the Fisheries Research Board, i.e., the Fisheries Experimental Station at Vancouver. There was also close collaboration during the year between anchovy fishermen, departmental officers and the scientific staff of the Pacific Biological Station at Nanaimo in efforts to develop wider knowledge of the life history and habits of anchovies frequenting the British Columbia coast, the data in respect of which at the moment is very incomplete.

The following table shows the production and marketed value of canned anchovies each year since 1939:

Year	No. of Cases*	Marketed Value
1939.....	—	—
1940.....	14,331	\$ 79,818.00
1941.....	2,181	15,617.00
1942.....	3,070	11,900.00
1943.....	2,099	11,483.00
1944.....	13,221	261,160.00
1945.....	4,957	82,545.00
1946.....	29,946	610,586.00
1947.....	26,040	536,850.00

\* In terms of 48 lb. cases but the general product is packed in cases of 48 x 4-ounce cans.

#### EXPORT CONTROLS—FRESH AND FROZEN SALMON

Throughout the war period the export of fresh or frozen salmon had been under close control to assure maximum production of salmon in canned form for the purposes of the Allied war effort. The export of Red spring salmon in fresh, frozen or mild cured form was allowed to continue; whereas the export of White springs was permissible up to June 30th each year; all other varieties were required to be processed in Canada. In 1946 these general controls were modified in minor effect, i.e., the export of White spring salmon was made permissible after August 16th. In 1947 the Department received strong representations from fishermen's organizations and others that these controls should generally be relaxed; it was urged that the continuance prevented competition from export markets which would have the effect of appreciably increasing fishermen's earnings. For the first part of the 1947 season the arrangement which had prevailed during the war years in respect to the

export of Red springs and White springs was again applied. As from September 25th, 1947, the export of pink salmon in fresh, frozen, salted or smoked form to any destination was sanctioned, and as from October 15th, 1947, the export restrictions for all varieties and forms of Pacific coast salmon, including steelhead, were dropped.

The undernoted table shows the prices which were received by commercial fishermen in the Fraser River area at various dates progressively during the season; the immediate rise in price which occurred following removal of the export controls in the case of coho, pink and chum salmon, which were still being caught at the time, will be noted, bringing higher returns at once to the fishermen. It was apparent at the same time that a slowdown in British Columbia canning immediately set in and in the case of chum salmon the volume of fish used for canning in British Columbia after September 25th was definitely less than the amount purchased for export for canning in the United States. Relaxation of the export restrictions brought about immediate exports of fresh and frozen salmon, as follows:

	Lbs.
Coho.....	1,700,000
Pinks.....	1,915,000
Chums.....	10,000,000

If canned in Canada this would have been the equivalent of nearly 200,000 cases.

#### PRICES PER POUND RECEIVED BY COMMERCIAL FISHERMEN FRASER RIVER

	Sockeye (Cts.)	Cohoe (Cts.)	Pinks (Cts.)	Chums (Cts.)
Aug. 15, 1947.....	.15	.10 $\frac{1}{2}$	.03 $\frac{3}{4}$	.03 $\frac{3}{4}$
Sept. 8, 1947.....	.17	.12	.04 $\frac{1}{2}$	.04 $\frac{1}{2}$
Sept. 25, 1947.....	.18	.12	.05 $\frac{1}{2}$	.04 $\frac{1}{2}$
Sept. 29, 1947.....	.18	.12	.08	.06
Oct. 1, 1947.....	.18	.12	.09	.06
Oct. 16, 1947.....	.18	.17	.10	.10
Oct. 20, 1947.....	.18	.17	.10	.12
Oct. 23, 1947.....	.18	.17	.10	.13

#### DESTRUCTION OF SEA LIONS

It was again found desirable to exercise control measures against sea lions at various points along the coast where there was definite evidence of interference by these mammals, not only in destroying edible fish, but also by damage to fishing gear. The following table shows the number of sea lions destroyed during the year in efforts to protect these considerations. Destruction was undertaken, by rifle fire, by officers and crew members of the various departmentally-operated patrol boats:

Area	Number destroyed
Deer Bay.....	2
St. Joseph Rocks.....	20
Cape St. James.....	12
Isnor Rocks.....	40
Day Point.....	3
Dungar Rocks.....	7
Butterworth Rocks.....	6
Granite Bay.....	4
Glendale Cove.....	96
Knights Inlet.....	92
Total.....	282



## DESTRUCTION OF HAIR SEALS

There was again serious complaint of the heavy toll of salmon and other valuable fish taken by hair seals at coastal points and the estuaries of the various streams. At certain times of the year, at particular points, the salmon gillnet fishermen report that hair seals rob their nets with impunity and that often these mammals secure more from the nets than do the fishermen. Over the years every form of destruction which gave promise of worthwhile results has been attempted; in recent years the bounty system has been continued as being the most effective in efforts to relieve the economic loss suffered from the depredations of these mammals. During 1947 a bounty of \$5 was again paid for each nose presented as evidence of destruction and in all 2,740 claims aggregating \$13,700 were paid, as per the undernoted table. It is commonly accepted that the numbers of claims paid represent only a fourth or fifth of the number actually destroyed; hair seal hunters estimate that they recover only one out of every four or five destroyed. Hence, it may be properly accepted that the bounty system as applied during 1947 resulted in the destruction of at least 10,000 hair seals:

Bounty Paid for Destruction of Hair Seals 1947-48	
Region	Amount
Vancouver Office.....	\$ 640.00
B.C. Region No. 1.....	380.00
B.C. Region No. 2.....	7,790.00
B.C. Region No. 3.....	4,890.00
Total.....	\$13,700.00

## VIOLATIONS

Prosecutions during the year totalled 193, involving violation of various fishery regulations. A total revenue of \$19,380.75 resulted from this source. Details are as follows:

	Dist. No. 1	Dist. No. 2	Dist. No. 3	Total
Prosecutions.....	43	40	110	193
Fines.....	\$ 604.00	3,660.00	4,213.50	8,477.50
Sales.....	1,026.39	6,069.20	3,807.66	10,903.25
Total: Fines and Sales.....	\$1,630.39	9,729.20	8,021.16	19,380.75

## EFFICIENCY OF FISHING AND PROCESSING OPERATIONS IN BRITISH COLUMBIA

The British Columbia fishing industry in general continued to maintain a high level of operating efficiency. The general standard of all fishing vessels is steadily rising, with greater operating range and seaworthiness. Equipment such as radio-telephones and direction finders is fast becoming standard operating gear. Improved accommodation and facilities are provided for crew members. All these considerations tend to a high over-all efficiency in the fishing vessels. The higher earnings in recent years have given fishermen the opportunity to provide for these various improvements.

It is again emphasized that while these improvements help to alleviate the strenuous and oft-times hazardous vocation of the fishermen, as well as contribute to the general benefit and welfare of the industry, they bring to the Department the problem of increasing pressure on available fish supplies, with its attendant considerations in providing adequate safeguards in the interests of conservation. The

tendency for vessels to participate in several branches of fishing is increasing. Some boats, for instance, during the course of a fishing season, may fish in turn for halibut, salmon, herring, and also perhaps take a short spell as draggers for bottom fish. Modern design, as well as high mobility, permits changing from one gear to another, and due to faster vessels any fishing ground in the Province's coastal waters is readily accessible.

Along with the high mobility attained in the fishing fleets, there has been a comparable development in the fleet of fish packer and carrier vessels. In addition to furnishing essential services to the fishing vessels, including ice requirements, etc., this fleet provides fast packing service between the fishing grounds and the processing plants. The latter, including cold storage establishments, generally continue to maintain and develop a high standard of modern fish handling and processing technique.

#### REMOVAL OF OBSTRUCTIONS

One of the duties continuing to receive particular attention by departmental personnel is that of the examination of streams frequented by salmon and other fish for spawning purposes. These examinations have a two-fold purpose, firstly, to enable an assessment of the extent to which parent fish have reached the spawning grounds and the reproduction which may be expected therefrom, and, secondly, to assure the accessibility of the streams as far as may be reasonably feasible for spawning purposes. These examinations have been carried on for many years and constitute a record of particularly valuable information. Many minor potential obstructions are immediately removed by the inspecting officers; others are removed or cleared away, as may be expedient, as quickly as possible; still others of more serious character are referred to the Engineering Branch of the Department. There has not been a Resident Fisheries Engineer under the departmental organization in British Columbia for several years, but it now seems likely that the appointment of an engineer will materialize shortly, and unquestionably the advice and assistance of such an engineer will be of material aid to the local fisheries officers in their particular stream duties.

#### SPORT FISHING

There has been a progressive revival in sport fishing in tidal waters since the end of the war. The increased activities in 1947 were attended by excellent fishing, particularly in the case of salmon. To residents of British Columbia this offers a form of recreation within easy reach of centres of population, and from the standpoint of tourists it unquestionably presents an attraction of major importance. Since the war an industry of substantial significance has developed in catering to sport fishing needs in the tidal areas. Fleets of row boats, as well as small boats powered with inboard engines, procurable on an hourly, daily or monthly rental basis, are immediately available; fishing rods and equipment are similarly procurable if required, and, at many of the more successful fishing locations, guides or boatmen may be engaged to assist inexperienced fishermen.

Increasing interest and participation in our salmon fisheries for sport and pleasure, and the growing economic returns incidental thereto is necessitating closer attention by departmental personnel to this phase to assure that protection and conservation needs for our salmon and other fish resources are accorded requisite consideration and action.

#### STAFF

Reorganization of the Department's administrative and inspection staff in British Columbia which began last year was further developed. Selection had been

made of forty-four appointees for positions as Fisheries Inspectors to fill vacancies which had occurred during the later war years, and new positions provided for in the reorganization. These appointees, all young veterans of the Armed Services, were given special training extending over a period of three months from January to April, including practical field experience and classroom lectures bearing on all subjects calculated to assist them in the duties they would be called upon to undertake. All were successful in the final examinations and all had been assigned to their posts by June 1st. During the course of the year several of these appointees dropped out of the service. At the close of the year thirty-five of the original group were on duty and it is a pleasure to testify that they have given service and co-operation of high standard generally in every way. There are men in this group from whom much more advanced duties will be looked for in the not too distant future. It is hoped that another group of trainee inspectors will be authorized in the near future to fill vacancies which take place from time to time.

There was further improvement during the year in the standard and service of vessels employed in fisheries patrol and fisheries protection. During 1946 many replacements of obsolete and inferior craft were authorized and in 1947 one other vessel of the sixty-foot R.C.A.F. service boat type was added, and several others are contemplated. Improved employment conditions were authorized for personnel of these boats, and this, together with accommodation improvements and additional equipment in the way of radiotelephones, echo sounders, direction finders, etc., has assisted in raising the standard and efficiency of our patrol organization to meet the important and onerous duties required of it.

OBITUARY:—The undersigned regrets to have to record the passing of two competent and conscientious officers, Messrs. W. P. Forsythe and Alexander MacDonald. Both were veterans of the first World War. Mr. Forsythe, previous to his assignment as Fisheries Inspector in the Prince George area, served as officer in charge of the salmon hatchery formerly operated by the Department at Kennedy Lake on the west coast of Vancouver Island. He had been twenty-eight years with the Department. Mr. MacDonald had served at several points in the Vancouver Island area, and had held the appointment of Fisheries Inspector for the Courtenay-Comox area on the east coast of Vancouver Island since April 1st, 1937. Both were held in high regard by their fellow officers and by the fishing industry.



## DEPARTMENT OF FISHERIES

STATEMENT No. 1--ANNUAL CANNED SALMON PRODUCTION IN BRITISH COLUMBIA--1938-1947

Year	Num-ber of can-eries oper-ated	Number of salmon licences issued					Packed canned									
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	Totals
1938	38	7,125	3,453	300	9	5	447,453	10,276	2,322	2,933	27,417	1,035	273,706	400,876	541,812	1,707,830
1939	35	6,502	3,947	339	9	5	269,888	10,302	2,848	2,947	48,209	797	196,887	620,595	386,584	1,539,057
1940	38	6,392	3,222	350	9	5	366,403	11,868	2,856	3,017	23,277	1,205	201,467	213,911	643,443	1,467,227
1941*	36	5,502	3,080	333	9	5	455,297	71,794	3,911	28,771	30,027	3,454	361,380	427,766	920,470	2,248,870
1942	30	6,382	3,878	312	9	5	666,571½	11,197½	3,826	9,721	23,265½	4,649	187,873½	270,622½	633,834	1,811,560½
1943	30	6,043	4,346	290	9	5	164,889	4,171½	2,199	4,287½	14,059½	3,095	171,983	530,188½	363,347½	1,258,221½
1944	30	5,426	4,483	293	10	5	247,714	3,633½	2,368	13,330	12,464	3,926½	169,082½	389,692	255,316½	1,097,557½
1945	29	5,646	4,764	312	9	5	329,001½	3,660½	2,686	6,447½	6,670	2,922	212,217	825,512½	350,188	1,739,311
1946	31	7,346	5,727	348	9	5	543,027	3,912½	1,305	2,823	2,914	4,115½	97,240½	116,607½	576,133½	1,348,138½
1947†	30	5,343	4,977	357	9	5	286,109	3,840½	2,596½	3,496	4,545	3,268½	139,620	599,882½	461,799½	1,505,157½

\* Does not include salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:—  
† Does not include salmon canned in 1947 from cold storage stocks caught in 1946, particulars of which are given hereunder:—

.....	8	31	1,079	.....	39,104	.....	6,339	46,561
388		84			2,128		905	28,321

\*  
†

\* Does not include salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:—

† Does not include salmon canned in 1947 from cold storage stocks caught in 1946, particulars of which are given hereunder:—

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NOTE.—Licences issued include transfers from one district to another, except in the case of purse-seines.



## STATEMENT No. 2—PACK OF CANNED SALMON ON THE NAAS RIVER—1938-1947

Year	Num-ber of can-eries oper-ated	Number of salmon licences issued					Packed canned									
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum	Totals
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases
*1938	2	309					21,746	458	189	125		188	20,485	61,660	15,135	119,986
†1938							14,795	13	165	125		188	3,986	29,843	6,804	55,919
*1939	2	289					24,425	170	389	149		15	3,209	29,819	2,615	60,791
†1939							18,884	17	297	137		15	1,667	19,479	1,784	42,230
*1940	2	254					13,810	1,258	181	275		120	11,447	29,893	5,461	62,445
†1940							8,056	118	95	99		117	1,975	12,151	2,149	24,750
*1941	2	281					24,876	133	187	207		377	14,430	23,274	5,971	69,455
†1941							14,221	16	125	147		147	6,711	12,570	1,757	35,694
*1942	2	328					24,461	496	366	255		619	21,008	54,038 <sup>1</sup>	12,691	113,934 <sup>1</sup>
†1942							11,415	46	202	159		155	9,804	24,693 <sup>1</sup>	5,794	52,268 <sup>1</sup>
*1943		167					13,413	422	386	194		334	9,769	17,670	10,156	52,344
†1943																
*1944	1	186					13,318	334	179	109 <sup>1</sup>		318 <sup>1</sup>	7,324	34,707	10,155	66,445
†1944							2,681	73 <sup>1</sup>		32 <sup>1</sup>		23	389	14,375	2,423	19,997
*1945	1	158					9,751	145	30	34		107 <sup>1</sup>	3,980	36,167 <sup>1</sup>	4,528 <sup>1</sup>	54,743 <sup>1</sup>
†1945							4,479	46		19		45 <sup>1</sup>	1,277	18,835 <sup>1</sup>	1,676 <sup>1</sup>	26,378 <sup>1</sup>
*1946		171					12,511	238	141	93		134	4,239	7,147	13,810	38,313
†1946																
*1947		204					10,877	266	63	66		158	5,168	5,075	8,938	30,611
†1947																

\* Pack of fish caught at Naas River regardless where canned.

† Licences issued, include transfers from other districts.

† Pack of Naas River regardless where caught.

## DEPARTMENT OF FISHERIES

STATEMENT No. 3—PACK OF CANNED SALMON ON THE SKEENA RIVER—1938-1947

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned								Totals	
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink		Chum
†1938.....	6	1,049					73,508	3,361	1,105	259		42	100,658	146,676	34,785	360,454
†1938.....							46,988	2,916	1,141	259		42	38,542	69,299	14,668	173,855
†1939.....	6	844					96,358	3,277	1,488	348		55	48,973	127,521	15,666	293,686
†1939.....							68,388	3,124	1,396	336		55	27,115	91,559	6,360	198,333
†1940.....	7	926					133,854	5,884	1,113	571		133	62,516	91,612	62,114	359,797
†1940.....							116,505	4,708	1,017	396		130	19,196	46,687	4,684	193,323
†1941.....	7	981					110,544	4,695	703	448		2,261	126,557	73,896	54,357	373,461
†1941.....							81,183	3,929	641	368		1,890	45,891	51,389	12,139	197,429
†1942.....	6	775					57,539	5,874	832	832		3,670	70,384	146,322	31,481	316,952
†1942.....							29,976	5,305	699	617		3,117	36,395	47,819	10,611	134,539
†1943.....	8	749					51,476	1,443	838	623		2,323	63,638	122,040	57,579	299,961
†1943.....							28,259	964	440	379		1,953	40,280	53,203	6,407	131,886
†1944.....	8	725					92,203	1,176	664	289		2,724	38,159	190,872	87,071	413,159
†1944.....							67,855	897	468	193		2,395	18,809	45,833	7,172	143,623
†1945.....	7	787					117,859	1,324	827	389		1,612	51,904	211,140	44,104	429,160
†1945.....							103,939	1,208	785	363		1,538	33,672	69,148	9,121	219,775
†1946.....	7	877					72,318	1,864	579	551		2,523	38,534	50,799	81,633	248,802
†1946.....							52,928	1,591	438	410		2,358	26,281	10,737	11,161	105,904
†1947.....	7	750					65,429	1,688	398	531		2,237	35,522	47,831	87,476	241,113
†1947.....							32,511	1,376	326	414		2,051	12,766	13,184	8,224	70,853

† Pack of fish caught at Skeena River regardless where canned.

‡ Pack at Skeena River regardless where caught.

NOTE.—Licences issued include transfers from other districts.

STATEMENT No. 4—PACK OF CANNED SALMON FROM FISH CAUGHT AT RIVERS INLET AND SMITHS INLET—1938-1947

Year	Num-ber of can-eries oper-ated	Number of salmon licences issued					Packed canned										Totals
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink	Chum		
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases	
1938	6	2,261					122,093	744	181	359		169	17,527	10,827	15,832	167,732	
1938							86,490	716	316	351		99	14,284	12,447	17,102	131,625	
1939	4	1,817					71,068	412	206	329		133	16,125	24,580	7,437	110,290	
1939							36,937	285	32	306		82	6,902	19,256	4,903	68,103	
1940	4	1,896					89,142	810	238	320	21	91	12,744	4,085	15,167	122,618	
1940							48,335	494	101	294		40	7,452	4,315	2,369	63,600	
1941	2	1,355					115,342	1,006	148	667		179	25,165	5,558	23,203	171,268	
1941							50,258	624	78	593		104	16,067	6,193	6,236	80,133	
1942	1	1,505					95,062½	745	104	144		60	10,280	1,481	21,364	129,240½	
1942							24,623	577	82	139		19	6,189	1,446	10,295	43,360	
1943	1	1,449					66,855½	223	591	208		135	12,270	16,093	17,376	113,751½	
1943							13,301	72	437	64		25	6,596	23,347	15,892	59,734	
1944	1	1,090					40,859½	107	623	140		88	14,843	6,280	5,205	68,145½	
1944							8,969	16	568	94		64	9,525	11,863	2,580	33,679	
1945	1	1,167					101,791	154	708	204		354	18,034½	12,369	20,515	154,129½	
1945							24,211	26	449	88		110	12,451	22,290	19,593½	79,308½	
1946	1	1,517					87,190	570	248	335½		347	9,452½	1,876½	45,521½	145,541	
1946							16,574	462	94	80½		87	5,367½	853½	31,485½	55,001	
1947	1	1,111					175,629	385½	18½	114		305½	5,531	10,069	21,769	213,821½	
1947							33,305	266½	2½	44		148½	4,532	7,246	19,968½	65,510	

Figures in Roman represent pack from fish caught at Rivers & Smiths Inlets, regardless where canned.  
 Figures in Italics represent actual packs at Rivers & Smiths Inlets, regardless where caught.

## STATEMENT No. 5 -PACK OF CANNED SALMON IN THE FRASER RIVER DISTRICT -1938-1947

Year	Num-ber of can-neries oper-ated	Number of salmon licences issued					Packed canned								Totals	
		G.N.	Troll	P.S.	D.S.	T.N.	Sockeye	Red Spring	Pink Spring	White Spring	Blue-back	Steel-head	Coho	Pink		Chum
							cases	cases	cases	cases	cases	cases	cases	cases	cases	cases
1938*		2,319	190	112			217,882	4,592	413	1,532	21,923	72	54,314	29,862	181,444	512,034
1938†							169,430	3,754	32	508		13	28,687	63	49,835	252,322
1939*	10	2,161	210				73,216	5,092	475	1,511	32,833	86	48,120	204,681	143,020	509,034
1939†																
1940*	10	2,237	212				43,294	4,466	448	1,094	8,428	69	17,144	108,608	42,480	225,986
1940†							121,080	4,036	311	1,042	13,627	178	47,397	13,243	178,860	379,774
1941*	11						86,215	3,411	279	770		144	12,369	12	40,056	143,256
1941†		2,025	195				149,716	7,132	1,285	25,507		248	28,260	102,799	90,274	405,221
1941*																
1941*							196,871	8,290	1,425	26,396	18,466	315	91,571	179,071	360,623	883,028
1942†	12	2,754	406				418,491	2,396	324	6,982		314	10,559	136	82,586	521,788
1942*							474,035½	2,856	688	7,552	22,999½	314	34,004	9,075	264,736	816,260
1943†	11	2,613	484				28,938	1,059½	237½	2,181½		246	8,391	30,394	53,954	125,401½
1943*							72,507	1,393½	646½	2,852½	14,059½	291	38,747	162,495½	127,450	420,442½
1944†	10	2,582	530				85,656½	607½	469	11,499	52	293	15,708½	130	13,875½	128,291
1944*							107,431	1,172	947	12,196	12,303	332	46,928	33,756	50,421	265,486
1945†	10	2,706	520				77,412½	723	621	3,891½	44	204½	15,160	100,572½	28,615	227,244½
1945*							123,384½	1,357½	1,195	5,437½	6,670	371½	60,536	285,351	117,044	601,347
1946†	13	3,738	525				307,854½	235	131	1,650		170	9,875	436	61,879	381,231
1946*							381,580	667	462	1,224	2,870	311	18,374½	6,105½	134,601½	546,196
1947†	12	2,205	369				27,857	351	252	1,102	2,914	178	8,576	103,953	18,683	163,866½
1947*							91,238	907	2,076	2,132	4,504	269	57,183	365,975	97,305½	621,589½

\* Represents actual pack, regardless where caught.

† Represents pack of Fraser fish, regardless where canned.

Note. - Licences issued include transfers from other districts. 1940† pack of Sockeye on Fraser, 86,215 cases, does not include 4,536 cases Sockeye caught on Fraser and exported and canned in Puget Sound canneries. 1941: The above figures do not include packs of salmon canned in 1941 from cold storage stocks caught in 1940, particulars of which are given hereunder:

	Red Spring	Pink Spring	White Spring	Coho	Chums	Totals
1941 pack of 1940 catch.....	8	31	1,079	39,104	6,339	46,561



STATEMENT No. 6—PACK OF CANNED SALMON OF PUGET SOUND, U.S.A.  
1938-1947

Year	Number of canneries operated	Spring	Sockeye	Coho	Chum	Pink	Steel-head	Total
		cases	cases	cases	cases	cases	cases	cases
1938	13	2,787½	134,651	9,820½	7,852½	193		155,304½
1939	14	2,439	43,511	54,773	14,505	275,485		390,713
1940	9	1,991	63,890	30,478½	21,618	2,732		120,718½
1941	9	4,706	110,605	45,968	21,170	153,686		336,135
1942	10	1,460	263,458	6,582	3,896	710		276,166
1943	10	2,872	19,116	26,219	224	61,479		109,910
1944	3	1,178	37,509	475	15	306		39,483
1945	4	3,733	53,054	18,958	158	307,940		383,843
1946	19	8,367	268,561	11,523	43,843	92		382,386
1947	21	20,922	8,462	79,336	143,204	609,880		861,804

STATEMENT No. 7—STATEMENT OF HALIBUT LANDINGS—BRITISH COLUMBIA  
1938-1947

(Includes landings in United States bottoms)

1938	193,488
1939	227,188
1940	239,043
1941	229,658
1942	243,915
1943	250,634
1944	189,248
1945	194,763
1946	228,739
1947	262,230

\* Figures for earlier years may be found in the annual report for 1940-41.

## STATEMENT No. 8—CANNED PILCHARD PACK—BRITISH COLUMBIA—1938-1947

	Cases		Cases
1938	69,374	1943	101,356
1939	7,300	1944	94,164
1940	59,166	1945	78,854
1941	58,038	1946	4,359
1942	46,451	1947	1,666

NOTE.—For earlier figures see Departmental report for 1940-41.

STATEMENT No. 9 PRODUCTION FISH OIL AND MEAL—BRITISH COLUMBIA  
1938-1947

Year	From Pilchards		From Herring		From Whales			From Other Sources*	
	Meal and fertilizers	Oil	Meal	Oil	Whale-bone and meal	Fertilizer	Oil	Meal and fertilizers	Oil
	tons	gals.	tons	gals.	tons	tons	gals.	tons	gals.
1938	8,891	2,195,850	9,624	929,158	273	490	543,378	2,491	228,157
1939	96	178,305	16,462	1,366,607				3,004	283,504
1940	4,853	877,556	24,264	1,700,819	181	434	361,620	3,526	285,314
1941	10,473.2	1,789,708	8,757.5	584,157	271	577	566,505	5,081.6	390,939
1942	11,550	1,622,840	10,898	643,577	130	205	255,556	4,537	263,481
1943	15,456.4	2,233,281	7,126.5	675,002				2,315.9	156,880
1944	10,278	1,962,040	8,832	889,213	62	90	134,553	1,675.25	131,507
1945	5,939.8	1,161,564	12,976.45	1,122,432				1,676.3	159,603
1946	673.1	74,612	8,463.5	847,232				1,429.5	172,840
1947	67.2	12,959	11,764.75	1,243,142				1,650.7	118,608

\* Salmon and halibut offal, gray fish, and anchovies.

STATEMENT No. 10—NUMBER OF WHALES LANDED—BRITISH COLUMBIA  
1938-1947\*

Species	1938	1940	1941	1942	1943
Sperm.....	252	126	233	130	69
Sulphur.....	4	2	1	1	.....
Fin.....	50	90	67	25	15
Hump.....	4	2	27	7	7
Sei.....					
Totals.....	310	220	328	163	91

\* No whaling plants operated in 1939, 1944, 1945, 1946 and 1947.

STATEMENT No. 11—STATEMENT OF LICENCES ISSUED FOR SALMON CANN-  
NERIES AND SALMON FISHING GEAR (NOT INCLUDING LICENCES TO CAP-  
TAINS AND ASSISTANTS ON SALMON SEINE-BOATS OR ASSISTANTS ON SAL-  
MON GILL-NET BOATS) BRITISH COLUMBIA—1938-1947

Kind of Licence	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
<i>District No. 1—</i>										
Salmon cannery.....	10	10	10	11	12	11	10	10	13	12
Salmon trolling.....	190	210	212	195	400	484	530	520	525	369
Salmon gill-net.....	2,319	2,161	2,237	2,025	2,670	2,613	2,582	2,706	3,738	2,205
<i>District No. 2—</i>										
Salmon Cannery.....	22	18	20	17	14	14	15	12	12	12
Salmon purse-seine. ....	100	98	131	95	105	87	94	105	144	176
Salmon drag-seine.....	9	9	9	9	9	9	10	9	9	9
Salmon trolling.....	958	863	737	791	706	903	876	980	1,262	1,068
Salmon gill-net—										
Lowe Inlet.....	80	135	106	61	25	83	91	35	44	24
Naas River.....	309	289	254	281	170	199	186	158	171	204
Skeena River.....	1,049	844	926	981	765	749	725	787	877	750
Rivers Inlet.....	1,796	1,550	1,518	1,070	640	1,211	948	1,022	1,281	936
Smiths Inlet.....	465	267	378	285	107	238	142	145	236	175
Bella Coola.....	242	216	192	161	155	194	175	192	153	152
Butedale.....	80	102	148	78	3	88	72	76	131	84
Namu.....	159	148	134	93	109	89	81	96	141	176
Queen Charlotte Islands.....	53	9	14	8	42	8	34	11	9	5
Total, salmon gill- net, District No. 2..	4,233	3,560	3,670	3,108	2,016	2,859	2,454	2,522	3,043	2,506
<i>District No. 3—</i>										
Salmon cannery.....	6	7	8	8	4	5	5	6	6	6
Salmon trap-net.....	5	5	5	5	5	5	5	5	5	5
Salmon purse-seine.....	200	241	219	238	207	203	199	207	204	181
Salmon drag-seine.....										
Salmon trolling.....	2,305	2,874	2,273	2,094	2,737	2,959	3,077	3,264	3,940	3,542
Salmon gill-net.....	573	781	485	459	567	571	390	418	565	632
<i>Whole Province—</i>										
Salmon cannery.....	38	35	38	36	30	30	30	29	31	30
Salmon trap-net.....	5	5	5	5	5	5	5	5	5	5
Salmon purse-seine.....	300	339	350	333	312	290	293	312	348	357
Salmon drag-seine.....	9	9	9	9	9	9	10	9	9	9
Salmon trolling.....	3,453	3,947	3,222	3,080	3,843	4,346	4,483	4,764	5,727	4,977
Salmon gill-net.....	7,125	6,502	6,392	5,052	5,253	6,043	5,426	5,646	7,346	5,343

NOTE.—Salmon cannery licences shown above were issued by the Provincial Fisheries Department.

STATEMENT No. 12—PACK OF SOCKEYE SALMON FROM RUNS TO FRASER RIVER  
1938-1947

Year	Fraser River	Canadian Traps in Juan de Fuca Straits	Puget Sound Pack	Total Cases*
1938.....	169,430	3,784	139,173	312,387
1939.....	43,249	4,290	43,511	91,050
1940.....	86,215	2,247	63,890	152,352
1941.....	149,715½	9,563	110,605	269,883½
1942.....	418,491	8,488	263,458	690,437
1943.....	28,938	1,339	19,116	49,393
1944.....	85,656½	2,494	37,509	125,659½
1945.....	77,412½	2,369	53,054	132,835½
1946.....	307,854½	19,765	268,561	596,180½
1947.....	27,857	904	8,462	37,223

\* Figures represent pack of Fraser River sockeye, regardless where canned.

STATEMENT No. 13—STATEMENT SHOWING PACKS OF CANNED SALMON, 1938-1947  
WITH QUANTITIES GRADED SECOND QUALITY AND PERCENTAGES

	Sockeye	Spring	Steel- head	Blue- back	Coho	Pink	Chum	Total
1938 Pack, cases.....	447,453	15,531	1,035	27,417	273,906	400,876	541,812	1,707,330
Grade B, cases.....	16,361			56½	1,111	1,413	1,583	20,524½
Per cent.....	3.656			.206	.405	.352	.292	1.201
1939 Pack, cases.....	269,888	16,097	797	48,209	196,887	620,595	386,584	1,539,057
Grade B, cases.....	3,444½	11	20	17	142½	45,667	1,068	50,370
Per cent.....	1.276	.068	2.509	.035	.072	7.358	.276	3.272
1940 Pack, cases.....	366,403	17,741	1,205	23,277	201,467	213,911	643,443	1,467,227
Grade B, cases.....	1,778½	57		13	461	2,530	3,298½	8,138
Per cent.....	.485	.321		.054	.228	1.182	.512	.554
1941 Pack, cases.....	445,297	50,476	3,454	30,027	361,380	427,766	920,470	2,248,870
Grade B, cases.....	1,186½	152½	2	33	539½	64,866	25,161½	91,941
Per cent.....	0.260	0.301	0.057	0.109	0.149	15.163	2.733	4.088
1942 Pack.....	666,571½	24,744½	4,649	23,265½	187,873½	270,622½	633,634	1,811,560½
Grade B, cases.....	39,753½	256		87	693½	8,676	17,654	67,120
Per cent.....	5.963	1.034		0.373	0.369	3.205	2.785	3.705
1943 Pack.....	164,889	10,658	3,095	14,059½	171,983	530,188½	363,347½	1,258,221½
Grade B, cases.....	227½	69			3	25,837½	7,823	34,760
Per cent.....	.137	.647			.002	4.873	2.153	2.762
1944 Pack, cases.....	247,714	19,362	3,926½	12,464	169,082½	389,692	255,316½	1,097,557½
Grade B, cases.....	723	101	1½		86	2,777	1,238½	4,927
Per cent.....	0.292	0.521	0.038		0.050	0.712	0.485	0.448
1945 Pack, cases.....	329,901½	12,800	2,922	6,670	212,217	825,512½	350,188	1,739,311
Grade B, cases.....	163	99			30	75,284½	4,474	80,050½
Per cent.....	0.049	0.773			0.014	9.119	1.277	4.602
1946 Pack, cases.....	543,027	8,100½	4,115½	2,914	97,240½	116,607½	576,133½	1,348,138½
Grade B, cases.....	1,313					2,924	1,245	5,482
Per cent.....	0.241					2.078	0.606	0.406
1947 Pack, cases.....	286,400	9,933	3,268½	4,545	139,620	599,882½	461,799½	1,505,157½
Grade B, cases.....	706	4½			7	71,515	594	72,826½
Per cent.....	0.246	0.045			0.005	11.922	1.286	4.838

STATEMENT No. 14—FISHERY LICENCES—BRITISH COLUMBIA—JANUARY-DECEMBER 1947

Variety of Licence	ISSUED				TRANSFERS				OPERATING					
	Whites	Indians	Chinese	Can- celled	Total	Whites	Indians	Chinese	Total	Whites	Indians	Chinese	Can- celled	Total
Salmon Trap-net	5	9			5					5	9			5
Salmon Drift-seine		33		1	358					324	33			358
Salmon Purse-seine	3,168	1,207	2		4,378	803	162		965	3,971	1,369	2	1	5,343
Salmon Gill-net	4,348	590		2	4,940	39			39	4,387	590		2	4,979
Salmon Trolling	202	72			274	17	1		18	219	73			292
Asst. Salmon Gill-net	188	116		1	305					188	116		1	305
Capt. Salmon Purse-seine	1,366	652			2,018					1,366	652			2,018
Asst. Salmon Purse-seine	1,378	77	1		1,456	5			5	1,383	77	1		2,018
Grayfish					1,456					916	113			1,461
Cod	916	113			1,029					88	4			1,029
Small Dragger	88	4			92					209	13	1	1	224
Miscellaneous	209	13	1	1	224					115	57			172
Crab	114	57			171	1			1	35				35
Smelt	35				35					662	260	1		923
Capt. Halibut or Black Cod	661	260	1		922	1				9				9
Capt. Halibut for Bait										14	14			14
Pilchard Purse-seine	14	9			23					12				12
Capt. Pilchard Purse-seine	12				12					128				128
Asst. Pilchard Purse-seine	128				128					3	3			6
Herring Purse-seine	62	3			65					36	10			46
Capt. Herring Purse-seine	38	10			48					333	62			395
Asst. Herring Purse-seine	353	62			415					26				415
Herring Gill-net	26				26					1				1
Capt. Pound	10	1			11					92				102
Capt. Tuna	92				92					91				91
Asst. Tuna	91				91					33				33
Abalone	3	33			36									
Totals	13,840	3,312	5	6	17,163	866	163		1,029	14,706	3,475	5	6	18,192

Indian Permits: Issued 1,437; cancelled 1—Total 1,438.



PLANT LICENCES ISSUED BY THE PROVINCIAL DEPARTMENT OF FISHERIES  
1947 SEASON*Canneries Licenced*

	Number
Salmon.....	30
Herring.....	18
Pilchard.....	4
Shell-fish.....	11
Tuna Fish.....	1

*Reduction Plants*

Herring Reduction.....	14
Pilchard Reduction.....	5
Dogfish Reduction.....	1
Fish Liver Reduction.....	7
Fish-offal Reduction.....	17

*Others*

Tierced Salmon Plants.....	7
Pickled Herring Plants.....	1
Cold Storage Plants.....	16
Fish-buyers' Licences.....	521
Non-tidal Fishing Licences.....	133
Sturgeon Fishing Licences.....	2
Herring Dry-saltery Licences.....	6
Salmon Dry-saltery Licences.....	2
Fish-processing Plant Licences.....	18
Processing aquatic plants Licences.....	2
Harvesting aquatic plants Licences.....	2

STATEMENT No. 15—STATEMENT OF DIFFERENT SPECIES OF SALMON AND  
METHOD OF CAPTURE REPORTED BY OPERATORS OF SALMON PURSE-  
SEINES, DRAG-SEINES AND TRAP-NETS AND BY SALMON CANNING, CURING  
AND COLD STORAGE ESTABLISHMENTS, OF GILL-NET AND TROLL CAUGHT  
FISH, BRITISH COLUMBIA, SEASON 1947.

Method of Capture	Sockeye	Springs	Blue- backs	Steel- heads	Coho	Pinks	Chums	Totals
Troll .....	4,908	611,858	155,751	1,822	1,596,416	240,771	52,793	2,664,319
Gill-net.....	3,588,192	244,371	1,126	31,249	533,256	4,074,642	2,099,178	10,552,014
Purse-seine...	233,728	20,805	761	1,437	359,172	7,844,020	3,593,925	12,103,848
Drag-seine...	24,799				6,584	6,285	872	38,540
Trap-net.....	3,637	17,216	220	1,086	43,091	168,284	2,646	236,180
Totals....	3,905,264	874,250	157,858	35,594	2,538,519	12,334,002	5,749,414	25,594,901

STATEMENT No. 16—STATEMENT OF NUMBER OF SALMON CAUGHT BY PURSE-SEINES, SHOWN BY SEINING AREAS BRITISH COLUMBIA, SEASON 1947

Area	Sockeye	Springs	Blue-backs	Steel-heads	Coho	Pinks	Chums	Totals
1.....	139	3		3	2,221	16,121	40,908	59,395
2.....	1,077	61		16	6,228	77,980	148,175	233,537
3.....	206	8		2	1,123	21,838	13,857	37,034
4.....	390			3	280	3,531	176	4,380
5.....	3,153	212	6	64	3,644	50,742	27,297	85,118
6.....	23,732	1,727	44	280	52,414	853,791	544,703	1,476,691
7.....	9,745	606		332	23,092	476,388	639,355	1,149,518
8.....	7,484	250	465	243	9,923	336,760	144,195	499,320
9.....	435	53		10	2,482	17,245	57,508	77,733
10.....	137	13		4	2,131	11,161	69,141	82,587
11.....					496	4	30,505	31,005
12.....	121,990	4,535	122	232	83,424	2,596,331	640,075	3,446,709
13.....	48,813	4,483	124	77	56,171	1,341,412	891,378	2,342,458
14.....		581			1,490	335	80,261	82,667
15.....	1	9			150	2,556	20,972	23,688
16.....	181	65		2	3,121	327,167	20,697	351,233
17.....	36,311	360		28	5,767	707,179	7,419	757,064
18.....		5			6	454	1,379	1,844
19.....	6	45			726	11,710	3	12,490
20.....	3,626	738		24	17,518	347,261	3,800	372,967
21.....	2,193	1,077		40	26,114	593,107	544	623,075
22.....					414		1,366	1,780
23.....	12,209	3,958		77	42,330	47,838	39,275	145,687
24.....	11,896				3,958	3,108	29,472	48,434
25.....	4				2,720	1	79,504	82,229
26.....		2			4,230		37,723	41,955
27.....		2,014			6,999		24,237	33,250
Totals.....	283,728	20,805	761	1,437	359,172	7,844,020	3,593,925	12,103,848

STATEMENT No. 17—FISH LIVERS AND VISCERA, ANNUAL STATISTICS, 1947

Species	Landed		Total Marketed Value \$	In Cold Storage		Liver Oils	
	Lbs.	Value \$		Lbs.	Value \$	Lbs.	Value \$
Salmon Livers.....	217	10	9	188	9		
Salmon Viscera.....	1,893	94	81	1,623	81		
Gray Cod Livers.....	26,899	1,936	2,403	1,364	104	6,863	2,299
Black Cod Livers.....	34,204	55,873	67,312	5,581	7,961	6,658	59,351
Black Cod Viscera.....	27,609	7,504	29,519	235	11	4,738	29,508
Ling Cod Livers.....	98,547	147,429	197,730	25,971	61,038	11,123	136,692
Ling Cod Viscera.....	104,632	8,899	7,823	4,577	676	13,317	7,147
Red Cod Livers.....	13,922	18,932	22,288	6,932	17,107	470	5,181
Halibut Livers.....	353,206	340,592	428,088	35,847	41,986	54,823	386,102
Halibut Viscera.....	463,413	90,214	175,264	10,862	1,629	21,742	173,635
Skate Livers.....	1,186	59	24	499	24		
Grayfish Livers.....	3,759,282	1,087,858	1,482,982	99,651	43,121	2,453,032	1,439,861
Southern Shark Livers....	10,340	28,794	44,307	5,440	21,147	3,409	23,160
Ratfish Livers.....	30,132	1,824	2,657	993	54	18,158	2,603
Miscellaneous Livers and Viscera.....	90,845	6,046	5,497	9,985	1,331	13,965	4,166
		1,796,064	2,465,984		196,279		2,269,705

## SALMON SPAWNING REPORT, 1947

## GENERAL SUMMARY

*Sockeye*—Good supplies spawned in the Naas system. A moderate seeding occurred in the Skeena, a feature being the unusually high percentage of "jacks" present. Excellent escapements to Rivers and Smith inlets were composed mostly of fish of the larger sizes. Due to the retarded opening date for sockeye fishing in the commercial areas and improved migratory conditions for ascending salmon, resulting from the programme of fishway installations at Hell's Gate and Bridge River Rapids by the International Pacific Salmon Fisheries Commission, there was a significant increase in the number of spawners in all the upper areas of the Fraser system over the very light escapement in the cycle year 1943. The general over-all seeding of this species for this cycle of the Fraser run still remains inferior to that of the other three cycles.

*Springs*—There was a fairly good spawning of spring salmon in the Fraser system, particularly so in the Prince George area, indicating in general an increase over the seeding of the brood years. Supplies in practically all other areas of the Province were satisfactory.

*Coho*—The migration of this species to the systems of the Province was below normal proportions and with few exceptions the spawning stocks of this variety were light in all districts.

*Pinks*—In comparison with the brood year 1945, the run of pinks to all portions of the northern mainland areas, with the exception of the Bella Coola sector, was disappointingly light. The seeding in the Skeena and Grenville-Prince areas was light. Moderate supplies spawned in the streams of the Butedale and Bella Bella areas. There was a fairly heavy escapement to the Kimsquit River and a satisfactory seeding of the Bella Coola system. A medium to heavy escapement occurred to the mainland streams of District No. 3; with few exceptions, the spawning in Vancouver Island streams was light. The escapement to the Fraser was not in the same abundance as in the parent year 1945; it was in general substantial, heavy in some streams and moderate in others. This condition unquestionably reflected the unusually heavy toll claimed by commercial operations en route and raises speculation as to whether the time has not arrived to consider bringing pinks under the international control now provided for sockeye by the Fraser Treaty, if adequate protection for the maintenance of this highly valuable run is to be assured. Squamish and Indian rivers received an excellent seeding.

*Chums*—Supplies in the principal chum areas over the Province were satisfactory. Streams in Skidegate Inlet and the east coast of Moresby Island were well stocked. Massett Inlet and Naden River and the grounds on the west coast of the Queen Charlotte Islands received a medium seeding. The escapement to the Butedale, Bella Bella and Bella Coola areas was moderately heavy, the larger streams being well stocked, while the smaller streams in many cases were only lightly seeded. In the East Coast section of District No. 3 the escapement, with few exceptions, was fairly heavy to all spawning streams; in the West Coast section the escapement was particularly good in Quatsino, fairly heavy in Alberni, moderate in Kyuquot and Nootka, and below average in Clayoquot. Moderate supplies spawned in the Fraser system. The escapement to the Squamish River was only fair.

## Review in Detail

*Massett Inlet and Northern Coast Graham Island Area*

Coho supplies were light in all streams. Pink salmon were not observed in the area, this being the "off" year for this variety. In general, the seeding of chums over the area was moderate. In Massett Inlet chum supplies reached Ain River and McClinton Creek in medium volume; elsewhere stocks were light. The grounds



in Naden River were fairly well covered with chum spawners. This is the only stream in the Naden Harbour locality in which chums were present.

#### *Skidegate Inlet and West Coast Graham and Moresby Area*

The seeding of coho was light. With the exception of the Tlell River where a light to medium run occurred, there were few pink salmon in evidence, 1947 being the "off year" for this species. Good supplies of chums reached the streams tributary to Skidegate Inlet but the run of this variety to the streams on the West Coast was disappointing; the fish were late in arriving and with few exceptions the grounds were seeded only moderately.

#### *East Coast Moresby Island*

Coho were observed in the streams of this area in light to medium numbers, showing some improvement in comparison to the brood year. Few pinks were present, it being the "off year" for this variety. The seeding of chums was generally satisfactory. Good supplies of this species were observed on the grounds in Atli Inlet, Juan Perez Sound and Skincuttle Inlet, while medium to heavy supplies reach the Cumshewa Inlet, Selwyn Inlet and Darwin Sound spawning areas, as well as the streams flowing into Lousecoone Inlet and Flamingo Harbour.

#### *Naas Area*

There was a satisfactory escapement in sockeye to the Meziaden Lake area, the principal spawning grounds for this variety in the Naas system. Stocks were somewhat greater than in 1943, but not heavy as in 1942. Medium supplies of spring salmon reached the different grounds over the area. With few exceptions the escapement of coho was light. A good seeding of pinks occurred in the streams tributary to the Naas River, but the number of spawners on the grounds of the coastal streams was small. Fairly satisfactory supplies of chums were present, especially so in the Kitsault and Illiance rivers, flowing into Alice Arm.

#### *Skeena—Babine—Morice Area*

The escapement of parent sockeye to all spawning grounds in this area was of moderate proportions, somewhat below brood year expectations; a noteworthy feature was the unusually high percentage of "jacks" present. Spring salmon supplies were satisfactory. The moderate coho seeding was lighter than brood year indications. Pink salmon were present in light to medium numbers only, a noticeable decrease from the seeding of the parent year 1945.

#### *Skeena—Lakelse Area*

Supplies of sockeye in the Lakelse and Kalum Lake watersheds were below normal, a short supply being particularly noticeable in Williams Creek, flowing into Lakelse Lake, one of the principal sockeye streams in the area. The escapement of spring salmon was light. Stocks of pink salmon were light, particularly so when compared to the parent year 1945. A normal seeding of chums occurred.

#### *Lower Skeena Area*

A medium escapement of sockeye occurred to Shawatlans Creek but supplies in the Oestal and other areas were light. There was a satisfactory seeding of spring salmon. Coho supplies were moderate, in common with the escapement of this variety in general to the Skeena watershed. Stocks of pink salmon in the coastal streams were fairly satisfactory, although considerably below proportions of the brood year 1945. The chum salmon seeding was normal.

#### *Grenville-Principe Area*

While the commercial catch of sockeye was not heavy, the escapement was satisfactory. An adequate seeding of coho occurred over the area, particularly so on the west coast of Banks Island. Although unusual conservation measures were



undertaken to protect pink salmon, the number of parent fish present in the streams, with few exceptions, was light, a sharp decrease from the brood year 1945. Chum supplies were of average volume.

#### *Butedale Area*

Stocks of sockeye were satisfactory. There was a light to medium escapement of coho spawners to the larger rivers in approximately the same numbers as in the parent year, but the seeding of some of the smaller streams, particularly those in the Laredo Inlet and Aristazabel Island areas was poor. The migration of pink salmon to this area was disappointingly light when compared with the brood year 1945. As a result of unusual conservation measures undertaken, a moderate seeding materialized with the best spawning occurring in the streams in Matheson Channel. There was a fairly good escapement of chums to all the larger rivers in the area, with the exception of Poison Cove, where supplies were light.

#### *Bella Bella Area*

Sockeye stocks were normal. Supplies of coho were moderate and below brood year expectations. The escapement of pink salmon was medium, heavy to some streams and light to others; in general, considerably lighter than the seeding of the parent year. Pink supplies in Koeey River were the lightest in many years. Chum stocks were generally good. Neekis, Howyet, Gullchuck and Kl-tse rivers were well seeded, and the escapement to other main streams was normal. The early run to Roscoe Inlet did not materialize in the same numbers as in 1946.

#### *Bella Coola Area*

Supplies of parent sockeye generally were below normal. Moderate numbers, below par, were observed in the Kimsquit Lake area. A medium seeding took place in the Bella Coola-Atnarko system. The main spawning grounds between Tenas and Lonesome lakes were fairly well covered with parent sockeye of fair size, while in the lower streams the percentage of "jacks" was noticeably high. Although the early run of coho was light, supplies from the late run resulted in a fair seeding in the Kimsquit, Dean and Bella Coola rivers. A fairly heavy escapement of pink salmon occurred to the Kimsquit River, while satisfactory numbers spawned in the Bella Coola-Atnarko system, concerning which the local officer states: "They made their first appearance at Atnarko on August 25th and the run was of considerable size. A heavy run lasted for over five weeks and inspection in late September still revealed excellent showing up to the foot of Lonesome Lake." A medium spawning of pinks occurred in the coastal streams. Chum supplies were generally good in nearly all streams in the area.

#### *Rivers Inlet Area*

Three inspections of the Owekano Lake spawning ground were carried out, the first commencing August 20th, the second September 6th, and the third, October 17th. Supplies of sockeye were reported to be the best in many years, all streams tributary to the lake being well seeded. The escapement was composed mainly of large-sized fish. "Runts" or "jacks" were not noticeably abundant. A rather heavy freshet, on September 13th, apparently affected only the major streams of the large watershed and occurred early enough to permit of a subsequent heavy spawning. In the opinion of the inspecting officer, no extensive damage resulted. Good stocks of spring salmon were observed in Whannock River; supplies in the Waukwash and Indian rivers, however, were small. Coho supplies were light. There was a good escapement of pinks to the limited pink salmon spawning grounds in the area. Chums were present in satisfactory numbers. The escapement of this variety to Draney's Inlet was exceptionally good and in Whannock River the seeding was equal to that of 1946.

*Smith Inlet*

There was an exceptionally good escapement of sockeye. Both the Geluck and Delebah rivers received a heavy seeding. Fish of larger sizes were predominant. Pink supplies were fair. Coho and spring salmon were scarce. The seeding of chums was better than average, rather heavy to the grounds at the upper end of Smith Inlet, and fair in the Takush River.

*Alert Bay Area*

Sockeye supplies were satisfactory; the escapement to Nimpkish River was particularly good, considerably better than in the brood year. An increase in escapement was also noted in Glendale Creek and the small lake area tributary to Kleena-Kleene River. Normal seedings occurred in Mackenzie, Nahwitti, Shushartie, Kahweekan, Quatsi and Fulmore rivers. Spring salmon stocks were satisfactory. The seeding of coho was only fair and below brood year indications. Pink salmon supplies were fairly satisfactory in Glendale River and other streams in Knights Inlet, and moderate in Thompson Sound, Bond Sound and other streams along the Mainland. The streams on the Vancouver Island side had about the same light escapement as in the brood year 1945. The seeding of chums was generally good, showing improvement over the brood years.

*Quathiaski Area*

The escapement of sockeye to Phillips River was fairly good, an increase over the brood years, while supplies in Hayden Bay Creek were only fair. Spring salmon stocks in Campbell River were very satisfactory in comparison with previous years, but the number of spawners in Phillips River was below average. The coho seeding was light and below expectations. The escapement of pink salmon to the streams on the Mainland side was good, considerably better than during the brood year; elsewhere, the seeding was light, it being the "off" year. There was a fairly heavy seeding of chums, an appreciable increase over the brood year supplies.

*Comox Area*

The seeding of spring salmon in Puntledge River was average. Supplies of coho over the area were normal. There was a fairly heavy escapement of pinks to Tsolem River, medium to Oyster River and light to French Creek and Puntledge River. Chum supplies were better than for several years; fairly heavy in the Big and Little Qualicum rivers, Waterloo, Cougar and Cook creeks and good in other streams with the exception of Nile Creeks and Tsolem River, where supplies were light.

*Pender Harbour*

Sockeye supplies in the Saginaw Lake area were again light and the usual small run occurred to Tazooni River at Narrows Arm. The seeding of spring salmon was average. Good supplies of coho reached the Toba Inlet area, but elsewhere the spawning was light. Pink salmon stocks were satisfactory over the area, particularly so in the Jervis Inlet vicinity. The seeding of chums throughout the area was good, stocks in most of the streams were heavier than in the brood year.

*Nanaimo-Ladysmith*

The seeding of spring salmon in Nanaimo River was somewhat below average. Coho supplies were satisfactory. Pink salmon do not frequent the streams in this area in any quantity, but numbers in the Nanaimo River were greater than in several years. The seeding of chums was highly satisfactory on all spawning areas.

*Cowichan*

Spring salmon stocks were the lightest for a considerable number of years. The number observed on the spawning ground was estimated not to exceed 5,000. The

seeding of coho was fair, somewhat better than the brood year. Chum salmon supplies were the best in many years.

#### *Victoria Area*

The seeding of coho was fairly good and equal to that of the brood year. Chums were present in all spawning streams in satisfactory numbers.

#### *Alberni-Nitinat Area*

There was a good escapement of sockeye to the Somass River system, much greater than the brood year. Supplies of this variety reaching Anderson River and Hobarton River compare favourably with the brood year. Spring salmon stocks were the best for some years. Good supplies of coho reached the streams over the area. Most of the spawning streams were well supplied with chums. The seeding of this variety was the best for several years.

#### *Clayoquot Area*

Sockeye supplies in the Kennedy Lake system and Megin River were light, somewhat lighter than in the brood years. The seeding of spring salmon was the lightest in the past five years. With the exception of Tranquil Creek and the Kennedy Lake area, coho supplies were light. Although the number of parent chums varied greatly in the different streams, the general over-all seeding was not satisfactory and below expectations.

#### *Nootka Area*

Spring salmon supplies were average. Coho do not run heavily to this area. The seeding of this variety although light compares favourably with the brood year. Chums generally were moderate and below expectations, and with the exception of a few of the large streams the seeding was somewhat less than brood year levels.

#### *Kyuquot Area*

Spawning spring salmon were present on the grounds in normal numbers. The seeding of coho was light to moderate, but on the whole somewhat lighter than in the parent year. The early runs of chums to the area was disappointing. Conditions on the spawning beds, however, improved considerably with the arrival of the late run. A moderate seeding resulted.

#### *Quatsino Area*

The quantity of parent sockeye reaching the several streams in this area was greater than usual. Fair supplies of spring salmon appeared in Marble Creek, the main spawning grounds of this variety; stocks in other streams frequented by this species were normal. In general, the coho seeding was average, fairly heavy in some streams and moderate in others. Few pinks were present, as it is the "off year" for that variety. The seeding of chums was particularly good in all spawning streams, considerably heavier than a brood year.

#### *Fraser River—Prince George Area*

There was an increase in the number of parent sockeye appearing on the grounds of this area in comparison to preceding cycle years. Stocks in the Francois-Stellaco watershed of approximately 1,446 spawners in 1939 increased to 9,000 in 1943 and to 40,000 in 1947. In the Stuart Lake watershed supplies of 550 sockeye in 1939 increased to 3,100 in 1943, and to 7,500 in 1947. All grounds frequented by spring salmon were satisfactorily stocked.

#### *Fraser River—Quesnel Area*

Approximately 74,000 sockeye were observed on the grounds over this area, compared to 16,300 in the brood year 1943. About 25 per cent of the 50,000 sockeye



reaching the Chilcotin system were immature "jacks". The spawning population of this species in that watershed in the brood year 1943 was 10,000. The supply in the Bowron River system, numbering 24,000, was the largest in a great many years, a notable feature being the many new grounds frequented by spawners this season. As was expected no sockeye appeared on the Quesnel spawning areas. Spring salmon stocks over this area were only fair.

#### *Fraser River—Kamloops Area*

There was an increase of some note in the number of parent sockeye observed on the spawning grounds in this district. In Raft River, in the North Thompson area, there was an exceptional increase over the brood year. The early run to Seymour River consisted of 7,000 spawners compared to 250 in the brood year. Between 60,000 and 70,000 late run sockeye reached Adams River in comparison to 5,000 in 1943. The seeding of Little River, South Thompson River and Scotch Creek, however, was light. Supplies of spring salmon, although only fair, were an improvement over the brood year, notwithstanding the greater number of "jacks" present. The seeding of coho was light.

#### *Fraser River—Lillooet Area*

Upwards of 135,000 sockeye spawned in the Birkenhead River. "Jacks" were numerous comprising perhaps 25 per cent. of the run. Approximately 50,000 spawners were observed on these grounds in 1943. The supply of this species reaching the Seton-Anderson system was light, very similar in numbers to the spawning of the brood year. There was a fair seeding of spring salmon in the Squamish system and Tyaghton Creek, tributary to Bridge River. Elsewhere spawning was light. Coho stocks over the area were light. An interesting feature was the supply of 1,500 pinks that spawned in the Seton system. This is the first time in a great many years that pinks have reached these streams.

#### *Fraser River—Yale-Lytton Area*

Very few salmon have frequented the streams in this area for many years. It is therefore of note that 500 pink salmon spawned in Anderson Creek, and that smaller supplies were present off the mouths of other streams in the area.

#### *Fraser River—Chilliwack-Yale Area*

Approximately 8,500 sockeye reached the spawning grounds of Cultus Lake watershed, a decrease in comparison to the spawning in the parent year. Spring salmon supplies were light. Coho appeared in medium numbers in the Chilliwack system, otherwise the seeding was light. Good supplies of pink salmon were in evidence but not in such abundance as in the cycle year. There was a fair showing in all streams above Chilliwack; Jones, Lorenzetti and Succer creeks were heavily seeded. The Chilliwack system received a medium seeding. Chum stocks were moderate.

#### *Fraser River—Mission-Harrison Area*

There was an increase in parent sockeye in Douglas, Spring and Hatchery creeks, tributary to Harrison Lake, while approximately 8,000 spawners of this species were present in Weaver Creek. Spring salmon and coho supplies were light. Although stocks of pinks were fairly heavy, they were somewhat below the brood year level. The seeding of chums was fairly good, better than the average in recent years.

#### *Lower Fraser Area*

The upper tributaries of the Pitt River received the best seeding of sockeye in many years. Spring salmon supplies were normal. The number of coho on the



grounds was disappointingly light, particularly so in the streams west of Mission. Good supplies of pinks were in evidence, the best spawning occurring in the South Alouette and Coquitlam rivers. The chum salmon seeding was below normal. Fair supplies were present in the North Alouette, Blaney, and Silver Creek, while stocks in Whonnock, Kanaka and West Creek were disappointing.

*North Vancouver Area*

Coho supplies were light in all streams. Good stocks of pinks and chums spawned in Indian River. Elsewhere the seeding was light.

*Squamish Area*

Squamish River system, at the head of Howe Sound, was well seeded with pink salmon. Chum supplies were only fair.

## REPORT OF CHIEF SUPERVISOR OF FISHERIES (E. D. FRASER) EASTERN DIVISION FOR 1947

There was a recession during the year from the high level of production reached in 1946. The landings of the varieties which produce the greatest returns to fishermen, cod and similar species, lobster, herring and mackerel, were below the previous year and the prices were less on the average. The strike of the deepsea fishermen on the Atlantic coast during the first three months of the year, is responsible for a considerable part of this decrease. Another factor contributing was reported to be lack of bait, and generally there was a feeling of uncertainty what quantity the market would take without a sharp drop in price. Prices recovered in the latter part of the year and the demand was good. The placing of relief orders was helpful in stabilizing the industry and stocks of cured and canned fish were mostly cleared from the dealers' hands at the end of the year.

The total of the landings of all varieties was approximately 15½ per cent less than in 1946. The landed value shows a greater decrease, proportionately, due mainly to the lower price paid for lobsters, and was approximately 27 per cent less than in 1946. The catch and landed value, while below 1946, are greatly in excess of the average of previous years.

*Nova Scotia*:—Total landings and landed value for the province in 1947 were:—

	Pounds	Value
Fish and shellfish.....	321,748,200	\$14,836,276
Irish moss, dulse and other marine plants..	7,075,400	100,541
Livers.....	2,555,600	110,772
		<hr/> \$15,047,589

*New Brunswick*:—Total landings and landed value for the province in 1947 were:—

	Pounds	Value
Fish and shellfish.....	216,899,500	\$ 5,912,370
Livers.....	496,500	20,687
		<hr/> \$ 5,933,057

*Prince Edward Island*:—Total landings and landed value for the province in 1947 were:—

	Pounds	Value
Fish and shellfish.....	31,962,000	\$ 1,811,050
Livers.....	265,900	5,318
Irish moss.....	5,677,200	63,721
		<hr/> \$ 1,880,089

These figures are unrevised; final data can be obtained from Fisheries Statistics of Canada, 1947.

### THE COD FISHERY

*Nova Scotia*:—The landings decreased approximately 30 per cent from the 1946 total but were greater than the average for previous years. Landed value was approximately 40 per cent lower, reflecting the lower prices and smaller landings. The prices became firm during the last half of the year and were equal to 1946 at the end. The large decrease in catch is due to the strike of the deepsea fishermen during the first three months of the year covering the Lenten period, when all offshore vessels were tied up.

*New Brunswick*:—There was a decrease in the catch of about 16 per cent as compared to 1946, with a decrease in landed value of about 31 per cent. The decrease in catch and value was due to lower prices and slackening of demand.

*Prince Edward Island:*—The catch shows a small increase of about 10 per cent but a sharp drop in landed value of 39 per cent. The decreased value is due to the greater part of the catch being salted instead of canned.

#### THE LOBSTER FISHERY

*Nova Scotia:*—There was a decrease in the catch of about 11 per cent as compared to 1946 and the landed value shows a sharp decrease of about 15 per cent. Prices in 1946 were high for canning size lobster and the fishermen received more than average returns. The decrease in catch is attributed to a seasonal variation, which is a usual occurrence.

*New Brunswick:*—A decrease in the catch also occurred in this area of about 20 per cent. As smaller quantities were marketed in the shell, the decrease in landed value was about 36 per cent, as compared to 1946.

*Prince Edward Island:*—The largest decrease in catch in any province is noted of about 22 per cent as compared to the previous year, and the catch is the lowest recorded since 1944. A sharp decrease in landed value occurred from the same causes as in the other provinces, but was proportionately larger—about 46 per cent—the cause being that greater part of catch was canned.

While decreases in the catch of lobster are noted in all provinces during the year, the average is about equal to previous years. For 1947 the catch was 30,000,300 pounds and the average 1935-39 was 30,884,000 pounds.

#### THE SARDINE FISHERY

The catch of sardines is almost entirely made in the Charlotte County waters of New Brunswick. The fishery showed increased landings of about 4 per cent and an increased landed value of 1.7 per cent. There was a good demand for these fish for canning and this operation was carried on at canneries on the east coast of the province as well as in Charlotte county.

#### THE HADDOCK FISHERY

*Nova Scotia:*—The catch was lower by approximately 7 per cent as compared to 1946 and there was a reduction of 12 per cent in landed value. The prices were not reduced to the same extent as for other line fish and the strike did not affect the haddock catch to the same extent.

*New Brunswick:*—The catch shows a sharp decrease in both landings and value—in landings approximately 35 per cent, and 44 per cent in value.

*Prince Edward Island:*—The catch was small, 237 cwts. but an increase of 147 cwts over 1946. These fish were taken incidental to other fishing.

#### THE HAKE FISHERY

*Nova Scotia:*—The catch of hake decreased about  $8\frac{1}{2}$  per cent compared to 1946, with an 18 per cent decrease in landed value.

*New Brunswick:*—Landings were approximately 11 per cent below 1946 while the landed value decreased about 40 per cent, due to much lower prices.

*Prince Edward Island:*—A decrease of about 28 per cent is noted in the landings and 50 per cent in the landed value. The reason for the sharp drop in value appears to have been the uncertainty regarding the sale of these fish when canned.

#### THE POLLOCK FISHERY

*Nova Scotia:*—There was a decrease of about 30 per cent in the catch and about 25 per cent in the landed value.

*New Brunswick:*—Shows a decrease in catch amounting to 35 per cent and a decrease in landed value of about 50 per cent.

## THE HERRING FISHERY

*Nova Scotia*:—Landings show a decrease of about 13 per cent as compared to 1946, with a decrease of 32 per cent in landed value. While there is a reduction in the catch the total for the year is above the average for recent previous years. There was a good demand for these fish particularly for bait, bloaters and for marinated herring.

*New Brunswick*:—There was a decrease in landings in this province of about 5½ per cent; the landed value decreased proportionately. Quantities of these fish are trucked to Charlotte county from the east coast during the spring run for processing and, to some extent, are exported to the factories in the State of Maine.

*Prince Edward Island*:—There was a small decrease, about 3 per cent, in the landings but an increase in landed value of about 15 per cent. These fish were largely used for bait and canning, with a good demand.

## THE MACKEREL FISHERY

*Nova Scotia*:—There was a reduction of about 20 per cent in the catch as compared to 1946 and a considerably greater decrease of some 32 per cent in landed value. Lower prices were paid throughout for this species.

*New Brunswick*:—The catch increased about 54 per cent over 1946 with landed value about 19 per cent greater. Prices were lower and the demand was not strong.

*Prince Edward Island*:—There was an increase of 20 per cent in the catch but a decrease of 23 per cent in the landed value. Prices were lower for all purposes. More than half the catch was canned.

## OTHER FISHERIES

*Swordfishing—Nova Scotia*

There was a reduction of about 38 per cent in the catch compared to 1946 and a reduction of some 28.5 per cent in landed value. The greater part of the catch is exported and the price was slightly better. Weather is a large factor in this fishery. While the catch was down, the season was an average one.

*Scallops—Nova Scotia*

Landings decreased about 11.5 per cent compared to the previous year and the landed value about 30 per cent, reflecting the lower prices paid generally.

*Salmon—New Brunswick*

The catch increased 13 per cent for the year but, owing to lower prices, the landed value decreased approximately 20 per cent from 1946. The greater part of the catch was made in the Miramichi area.

*Smelts—New Brunswick*

There was an increase of some 7 per cent in the landings of smelts and, as the prices were good, an increase of about 9 per cent in the landed value. The catch is still greatly below the peak production years.

*Oysters—New Brunswick*

The production was about the same as in 1946, with a small increase in landed value. These shellfish were in good demand during the autumn months.

## GENERAL

*Irish Moss*

Owing to a lessened demand there was a big reduction in the quantity of this plant harvested in Prince Edward Island. In 1946 the amount was 100,082 hun-



dredweights valued at \$124,330. For 1947 the amount was 56,772 hundredweights valued at \$63,721—a decrease in amount of approximately 43 per cent and 48 per cent in value.

In western Nova Scotia the harvesting of this product is now a major source of revenue. It is gathered by raking and bleached before shipment. The quantity produced in the province in 1947 was 7,075,400 pounds in a green state, valued at \$100,541.

### ANGLING REPORT

Inland sport fishing was not as good as in 1946. Water levels in the streams and lakes became low early in the summer which, coupled with high temperatures, created conditions unfavourable to sport fishing.

The catch of salmon and grilse by angling in Nova Scotia was 3,568 fish as compared to 4,166 in 1946. There were more taken in the LaHave and St. Mary's rivers but in the other streams the number was less.

In New Brunswick there was a smaller number of salmon taken in the counties bordering the east coast while in the counties along the Saint John River there was a large decrease. The total number taken by angling was 18,586 salmon and grilse of which 5,455 were the so-called *black salmon* or spring fish.

The lack of rain and high temperatures in all provinces made conditions unfavourable for trout fishing and while few catches were made in the spring and early summer months, few fish were taken after the month of June.

#### DEEP SEA ANGLING

This sport is largely confined to Nova Scotia and the outstanding event was the tuna tournament held at Wedgeport, Yarmouth County, from September 2 to 6. The teams competed represented the British Empire, Cuba, and the United States of America. This sporting contest is sponsored and under the direct supervision of the Nova Scotia Government. The contest was won by the team representing Cuba.

#### THE FISHING FLEET

The fishing fleets in all provinces are in good condition and many replacements have been made. The most notable development in the small vessel class was the construction of 5 small draggers in Gloucester County to fish from Caraquet, N.B. These vessels were built for fishermen with assistance from the New Brunswick Loan Board and operated successfully.

The use of small draggers is becoming more general and 15 licenses were issued during the year compared to 6 in 1946. A number of the vessels licensed were those changed over from other fishing methods. There was one vessel added to the large trawlers, the *Mahaska* being fitted out for otter trawling, this being a change over from fishing with baited hooks.

The use of echo sounding machines by boats seining for herring and sardines is becoming more general in the Bay of Fundy coastal area of New Brunswick. These machines have proved their value in this operation. One scallop boat, fishing off-shore out of Halifax, has been equipped with the same device.

#### INDUSTRIAL DEVELOPMENTS

Four new sardine canneries were built and commenced operations in Charlotte County, New Brunswick during the year, the names and locations being:—

Name	Location	Capacity
B. H. Wilson Fisheries Ltd.....	Grand Manan	1,000 cs. daily
Richardson Fisheries.....	Deer Island	250 " "
Maritime Seafoods.....	Le Preau	300 " "
Seal Cove Canning Co.....	Grand Manan	300 " "

A number of small dryers for preparing salt fish for market were built in Nova Scotia from plans supplied by the Atlantic Fisheries Experimental Station, Halifax, and where requested the engineer from the station made the necessary survey and advised the owner during the construction. Two plants of this nature were added in New Brunswick, one for the St. John Fish Company and the other for the Sealands Food Corporation at Shippegan. The cold storage plant at Mulgrave, N.S., owned by A. & R. Loggie, Ltd., was rebuilt and this company built a new cold storage plant at Loggieville, N.B.

#### CLOSE SEASONS

The observance of closed seasons, with the exception of the areas of Prince Edward Island and the east coast of New Brunswick which are adjacent to the line defining the boundary between lobster districts 7B and 8, has been good. In the sections mentioned the effort to catch lobsters out of season has been persistent and difficult to deal with. The officers there have been vigilant but were handicapped by not having more suitable patrol craft. It is hoped that this condition will be remedied shortly.

#### PATROL AND PROTECTION SERVICE

The same number of chartered and departmental boats were engaged in patrol work as in 1946 and generally gave good service. There is an urgent need of replacing a number of the departmental boats and adding to their numbers to improve this service. Plans to do so have been made by replacing two of the larger type boats and the addition of three small fast motorboats. The C.G.S. *Cygnus* was placed at Pictou during the month of May for the completion of repairs and some additions to the engine equipment. After proceeding to Lunenburg for the Fishermen's Exhibition week she returned to Prince County, Prince Edward Island, to deal with illegal fishing. She proceeded from that area to Western Nova Scotia for duty there and was stationed at Canso for a period as mother ship.

#### FISH INSPECTION

Requests for the inspection of salt dried fish being exported were numerous and only a few lots were shipped without being viewed by an inspecting officer. On December 15, this requirement became compulsory. Inspections of this cure are made at the time of packing and give 100 per cent coverage.

Considerable inspection work was undertaken in connection with the purchases of relief shipments. All the dried fish was inspected and 35,000 barrels of pickled fish were opened and examined. The work was done to the satisfaction of the trade.

The Canadian Atlantic Salt Fish Exporters Association have made a request for the voluntary inspection of export pickled fish; the fish, if found satisfactory, would be covered by an inspection certificate.

#### FISH INSPECTION LABORATORY

The staff of the Laboratory, during the first part of the year, were engaged to a considerable extent in the inspection and grading of canned fish for relief purposes and following an interlude were busy again on the same work after the placing of the second relief order.

In addition to the main laboratory in Halifax, two others were opened, one at Shediac for the Province of New Brunswick, the other at Charlottetown for Prince Edward Island. Both these outposts dealt with canned fish produced in the Province of Quebec.

There were 337,000 cases of canned fish submitted for grading, which included all products except sardines. The grading showed 8 lots, totalling 2,538 cases, as being unfit for food which were kept off the market. In addition, 58,516 cases of fish, mainly sardines, were inspected for quality. Of this number, 950 cases were condemned as unfit for food.

## STAFF

Plans had been in making for some time to enlarge the staff of inspectors and provide for their direction by making a new division of the provinces into smaller administrative areas. This plan was put in effect during the year. Following examinations to select suitable men, a course of training for 91 new inspectors was carried out at Halifax under a D.V.A. plan to qualify them for appointment. Of the whole group 90 men were passed and of this number 86 were placed in the new positions created or those vacated by permanent officers who were promoted to a higher grade. Senior positions—unit heads—for direction of the field inspectors were established and were filled by promoting inspectors on the permanent staff who were qualified. A regional head office for each province was also established and the positions created were filled by promotions from the permanent staff of district supervisors.

The new inspectors were taken on the establishment on June 10 and in general have given satisfactory service. At the end of the year all unit officers were established and had been provided with clerical assistance. All regional offices, which in all cases are at the Provincial capital city, were fully staffed and the whole establishment completed.

During the year the Fishermen's Exhibition at Lunenburg was reopened and exhibits were prepared and displayed by the St. Andrews Biological Station, the Atlantic Experimental Station, the Fish Culture Branch and the administration branch. An appreciation of the efforts in this connection was received from the exhibition management. The exhibition continued for four days, September 16 to 19.

In closing I wish to express my thanks and those of the Division staff for the assistance and counsel of the officials in Ottawa in what was a rather difficult task of placing and directing the many new persons engaged during the year.



**ANNUAL REPORT OF CHIEF SUPERVISOR OF FISHERIES  
(H. V. DEMPSEY) CENTRAL DIVISION (PRAIRIE PROVINCES  
AND NORTHWEST TERRITORIES) FOR 1947**

All whitefish produced in the Provinces of Manitoba, Saskatchewan and Alberta, and in the Northwest Territories, has been subject to inspection since November, 1944 under joint federal-provincial action. Whitefish lakes are surveyed under a uniform procedure to determine the quality of the production. Surveys and primary inspections are performed by provincial officials under the direction of the chief federal officer. For this work, the provincial inspectors have the status of federal officers. No whitefish may be shipped from the Prairie Provinces or the Northwest Territories except under certificate issued and signed by an authorized inspecting officer. Late in 1947, shipment inspection commenced on a voluntary basis and proved successful as a further means of maintaining quality.

During the year, survey work was continued and several new lakes were examined in addition to the resurveying of many established whitefish producing lakes. A statement of the survey work is as follows:

	Individual lakes Surveyed		Resurveys		No. of Fish Examined		Weight (Lbs.)	
	1944-1946	1947	1944-1946	1947	1944-1946	1947	1944-1946	1947
Manitoba.....	86	15	35	46	18,146	8,434	51,885	26,456
Saskatchewan.....	124	39	31	31	16,618	7,226	54,869	22,879
Alberta.....	61	3	18	15	9,180	2,219	30,018	6,344
Northwest Territories.....	3	—	2	1	469	999	1,246	2,674
	274	57	86	93	44,413	18,878	138,018	58,353

*Northwest Territories*

Winter commercial fishing at Great Slave Lake was attempted for the first time during the period December 1, 1946—March 31, 1947 under a catch limit of 1,000,000 pounds, dressed weight, of whitefish and trout. The north shore operation in the Yellowknife area failed through lack of adequate transportation and the entire production of 100,000 pounds of whitefish and trout was lost. However, the fishery in the vicinity of Lower Hay River produced the following catch which was successfully marketed:

	Fresh (lbs.)	Frozen (lbs.)	Total (lbs.)
Whitefish.....	25,200	78,784	103,984
Trout.....	3,360	13,211	16,571
Inconnu.....	6,780	18,100	24,880
Others.....		530	530
	35,340	110,625	145,965

Following the opening of a road from Grimshaw, Alberta, to Lower Hay River, N.W.T., it was found possible to haul fish to the railhead by truck and, in the last two weeks of the season, over 35,000 pounds of fish was marketed fresh.



The completion of the road will likely open up the south shore of Great Slave Lake to both summer and winter fishery on a large scale.

Summer fishing was again conducted in the northern portion of the lake with a catch limit of 2,500,000 pounds of whitefish and trout. The following catch was reported:

	Round Weight	Dressed Weight
Whitefish.....	775,156	716,165
Trout.....	1,359,327	1,187,494
Inconnu.....	52,067	39,570
Totals.....	2,186,550	1,943,229

Marketing of the catch was as follows:

	Fresh Dressed	Frozen Dressed	Frozen Fillets
Whitefish.....	21,060	61,350	336,740
Trout.....	251,570	570,515	126,844
Inconnu.....		37,279	
	272,630	669,144	463,584

The summer operation employed sixty-one fishermen using 55,000 yards of gill net while forty-seven fishermen operated during the winter season with 19,000 yards of net. One of the interesting features of the summer operation was the development of shipments by air. Over one quarter million pounds of fresh trout was flown from the lake to the railhead at Waterways, Alberta, a distance of nearly 450 miles. The balance of the production was frozen and taken by refrigerator barge to railhead via the Slave and Athabasca Rivers.

Commercial fishing for pickerel (*Stizostedion vitreum*) was attempted during the summer at Kakisa Lake where a catch limit of 200,000 pounds had been established. Transportation and equipment difficulties forced abandonment of the operation.

#### Conclusion

The development of new inspection techniques and the extension of commercial fishing activities in the Northwest Territories resulted in a considerable increase in the volume of work in the Division with which it was often difficult to deal due to lack of trained personnel. Absence of suitable transportation prevented adequate patrol of Great Slave Lake during both summer and winter operations.

## REPORT ON THE WORK OF THE CANNED FISH INSPECTION LABORATORY, VANCOUVER, BRITISH COLUMBIA, FOR THE YEAR 1947-48

*By F. CHARNLEY, Chief Chemist*

During 1947 the work of the Laboratory, apart from the routine examinations, has been mainly concentrated on Part II of the investigation into the quality of sockeye salmon taken in the Gulf of Georgia as compared with salmon taken in the Fraser River. Part I of this investigation was reported November 28, 1946, and showed that the use of gill nets results in very definite selection of the sockeye salmon in the Fraser River fishery. Part II of the investigation embraces a study of the quality of the experimental samples of sockeye salmon packed in September and October, 1946. Under the circumstances, progress on Part II of the investigation has been quite satisfactory, but owing to factors beyond the control of the Laboratory there have been disappointing delays in carrying out the analyses.

Delays in carrying out the analyses sprang from the lack of certain items of apparatus ordered in my letter of September 21, 1946, and from loss of technical staff. In the early stages of the work the lack of equipment was unimportant because the preliminary work consisted of an investigation of the most suitable procedures for the analyses. Early in March, however, work on the procedures had been nearly completed, so that the lack of equipment delayed commencement of the analyses for about a month until the required apparatus was borrowed from the Pacific Fisheries Experimental Station late in April, 1947. Progress on Part II of the investigation was again greatly retarded late in 1947 owing to the loss of two members of the staff who had been assisting with the analyses.

The analyses of the experimental samples were finally commenced on April 29, 1947, and the results of the analyses of samples of three fish drawn from the first time group, that is, from the samples packed on September 10th, 1946, corresponding to areas, A, B, C and D, became available in the second week in May. Since the Department was anxious to obtain preliminary reports on this investigation, the results of the analyses of the samples of three fish drawn from the first time group were reported by letter of May 16, 1947. Similar progress reports giving the results of the analyses of the remaining time groups were reported in letters of May 26, June 20, June 23, June 25 and June 27.

The characters measured in the analyses of the first set of samples of three sockeye salmon were firmness, intensities of the red and yellow colours of the muscle tissue, percentages of water, fat, and Kjeldahl nitrogen, relative Vitamin A of the oil, pH of the aqueous liquid, and refractive index of the oil. In the first set of results, however, there appeared to be no significant differences in relative Vitamin A from area to area, and similarly there were only small differences in Kjeldahl nitrogen in samples drawn from the different areas. In order to save time determinations of these two characters were therefore omitted in the analyses of the second set of samples of three sockeye salmon taken weekly from the various areas. Furthermore, since the results of the analyses of the first set of samples of three largely served to confirm the results of the work carried out by the writer in 1943-44, it seemed unnecessary to continue with further progress reports on Part II of the investigation until completion of the analyses of all the experimental samples packed in the investigation, that is, the samples of twelve fish taken weekly in the various areas over the six-week period of the experiment.

Owing to the decreases in staff mentioned above, however, the analytical work was again delayed so that it appeared desirable in December to report the further analyses that had been carried out since the summer, namely, the analyses of the second set of samples of three salmon. These were reported by letter of December 26, 1947, and the results from this and the preceding set were summarized in tables XXXI and XXXII of my letter of December 26, 1947. Since the analyses for

relative Vitamin A and Kjeldahl nitrogen were omitted in the analyses of the second set of samples, summaries of the measurements of these two characters were not included in the data listed in tables XXXI and XXXII.

As already indicated, the results of this investigation have so far served mainly to confirm the results of the investigation that was carried out in 1943-44, namely, that, apart from discolourations on the skin, there are no important differences in quality between sockeye salmon taken in the Gulf of Georgia and sockeye salmon taken simultaneously in the Fraser River. There are pronounced seasonal changes in the quality of British Columbia sockeye salmon, and these apparently continue late in the season, as illustrated by the rapid falling off in quality of the samples of sockeye salmon taken in the Sooke area at the end of the period covered by this investigation. A new phenomenon, however, at least new to the writer, was the rather pronounced selective effect of the gill nets in the Fraser River fishery revealed in Part I of this investigation.

Work on a second investigation on quality was commenced in 1947. Experimental samples of pink salmon were packed during the 1947 season for an investigation into the relative quality of salmon of this species taken in the Gulf of Georgia area compared with salmon taken in the Fraser River area. The plan for this investigation was similar to that followed in the sockeye investigation, but with weekly samples of six instead of twelve fish being taken from the various areas. No analyses have yet been undertaken in this investigation.

Semi-routine incubation tests on samples of canned salmon and canned herring were continued during the 1946-47 season with results similar to those of preceding years, that is, no non-sterile tins were detected. It is thus becoming increasingly evident that, where spoiled tins appear in parcels of canned salmon or canned herring shipped to tropical countries, there has been entry of putrefactive organisms subsequent to processing. Precautions should therefore be taken to protect such parcels in transit and on arrival from extreme weather conditions in order to reduce as far as possible the rates of degradation of the seams and corrosion of the tin plate.

During the past year the Laboratory has carried out a considerable number of special examinations. These are frequently of an experimental nature where the company wishes to check the effectiveness of the processing, the amount of post-mortem spoilage, the seasonal condition of the fish that it is packing, and similar points. When the necessary staff is available the Laboratory is very pleased to carry out these unofficial examinations, but it should be noted that owing to lack of technical staff it may be necessary to discontinue this service in future.

During the past season two more fishing companies in British Columbia have introduced tests for postmortem spoilage in unprocessed herring. Some time has therefore been spent by the laboratory in the preparation of apparatus and in demonstration work for these companies.

Finally, a very considerable amount of time has been spent in recent weeks in the preparation of the inventory of apparatus and equipment requested by the Department.



## REPORT OF THE ATLANTIC FISH INSPECTION LABORATORY HALIFAX, N.S., FOR THE YEAR 1947-48

By ERNEST HESS, *Director*

During the year the Laboratory "graded" almost the same amount of canned fish as in the previous year. A steady decrease in the percentage of sub-standard and unfit lots can be noticed from 8.6 per cent in 1945-6, to 5.5 per cent in 1946-7, to 2.4 per cent in the current year. The amount of "inspected" canned fish was over three times that of the previous year, mainly due to a great increase in the amount of canned sardines being submitted for inspection. The total amount of canned fish examined rose by 15.2 per cent to 449,744 cases. The amount of work at the seasonal laboratory at Shediac was practically doubled over the previous year, mainly due to an exceptionally heavy spring herring pack on the East Shore of New Brunswick.

Two canning technologists were engaged throughout the canning seasons in visiting fish canneries and assisting cannerymen with their technical and quality control problems.

The work on the sanitary control of shellfish plants and shipments was facilitated and improved during the year by putting into operation a mobile bacteriological laboratory, which visited all clam shucking plants, scallop meat plants and chilled lobster meat plants in the Division and several oyster areas in Prince Edward Island, checking bacteriological purity of water supplies and finished products, and thus contributing to the improvement of plant sanitation.

After an interval of eight years, short courses for foremen of fish canneries were offered by the Department through the facilities of the Laboratory and its staff. Three one week courses were carried through successfully during the month of March.

A cutting demonstration of over 200 samples of different domestic and imported canned fish was held by the staff during the East Coast Fisheries Conference at Charlottetown, P.E.I., April 2, 1947.

### A. CANNED FISH

#### 1. GRADING

The kinds of canned fish for which Standards of Quality and Grade have been established are listed in Table 1, which summarizes the results of the year's work.

A net total of 1,187 grading certificates were issued.

A total of sixty-eight lots of graded canned fish, comprising 21,968½ cases were *regraded* after appeals, such action having been authorized by the Minister. For forty-one lots, totalling 12,511 cases (57 per cent) the original grades were confirmed, while twenty-four lots, totalling 8,810 cases (40.1 per cent) gained a higher grade and three lots totalling 647½ cases (2.9 per cent) received a lower grade. A net revenue of \$440 was received in regrading fees.

#### 2. INSPECTION

##### (a) *Quality*

*Canned Fish Inspection Certificates* were issued for 340 lots of those kinds of canned fish for which Standards of Quality and Grade have not been established. The results of the year's work are detailed in Table 2.

One lot of Class "B" quality sardines, 1,170 cases, were re-inspected and gained a "Fair Average Quality" certificate.

##### (b) *Weight*

A total of ninety-three lots of canned fish of various kinds were found to be shortweight, as determined from samples submitted for grading or inspection, or from routine samples examined by fisheries inspectors or the Laboratory.



TABLE 1

Kind of Canned Fish	Number of cans per case and net content of cans	Number of cases submitted for grading	GRADING RESULTS			
			Fancy	Standard	Sub-Standard	Unfit
	oz.		p.c.	p.c.	p.c.	p.c.
Lobster.....	96 x 6	918	49.9	48.9		1.2
Lobster Paste.....	96 x 6	103				100
Chicken Haddie.....	48 x 14	99,716	64.5	31.9	3.0	0.6
Flaked Fish.....	48 x 14	63,602½	61.1	38.9		
Mackerel.....	48 x 15	48,754½	67.7	26.9	3.5	1.9
Mackerel Fillets.....	48 x 15	5,363½	91.3	8.7		
Mackerel Fillets.....	48 x 10	1,102	50.9	49.1		
Herring, Plain.....	48 x 15	63,907½	87.1	12.8	0.1	
Herring, Plain.....	48 x 10	25,280	70.7	24.0	4.1	1.2
Herring in Tomato Sauce.....	48 x 15	2,520½	39.7	60.3		
Herring in Tomato Sauce.....	48 x 10	790	12.7	63.3		24.0
Gaspereau.....	48 x 15	11,763½	94.9	5.1		
Gaspereau.....	48 x 10	6,737	84.1	13.2	2.7	
Herring Fillets.....	48 x 10	230½	4.3			95.7
Kipperd Snacks.....	100 x 5	1,130	100			
Shad.....	48 x 15	645	100			
Shad Fillets.....	48 x 15	364	100			
Shad Fillets.....	48 x 10	1,222	100			
Tuna.....	96 x 7	4,250	3.5	94.1		2.4
Total—1947-8.....		338,399½	66.1	31.5	1.7	0.7
Total—1946-7.....		355,178½	67.4	27.1	4.5	1.0
1945-6.....		341,581½	69.0	22.4	7.7	0.9
1944-5.....		133,897½	82.3	13.1	4.6	

TABLE 2

Kind of Canned Fish	Number of cans per case and net content of cans	No. of cases submitted for inspection	INSPECTION RESULTS		
			Certified fair average quality	Class B	Unfit
	oz.		p.c.	p.c.	p.c.
Finnan Haddies.....	48 x 14	6,435	92.8	7.2	
Pollock.....	48 x 14	4,388	96.8	0.4	2.8
Hake in Tomato Sauce.....	48 x 14	4,400	100		
Gaspereau in Tomato Sauce.....	48 x 15	1,805	83.1	16.9	
Herring, Plain.....	48 x 10	185	100		
Herring in Tomato Sauce.....	48 x 15	614	100		
Herring in Tomato Sauce.....	48 x 10	100	100		
Sardines in Oil.....	100 x 3½	68,479	93.2	6.8	
Sardines in Oil.....	96 x 5	2,799	90.4	9.6	
Sardines in Tomato Sauce.....	100 x 3½	13,861	60.0	40.0	
Sardines in Tomato Sauce.....	96 x 5	1,320	76.5	5.2	18.3
Sardines, Smoked.....	100 x 3½	5,458	81.0	19.0	
Fish Cakes.....	48 x 15	1,500	100		
Total—1947-8.....		111,344½	88.6	11.1	0.3
Total—1946-7.....		35,107	99.4		0.6
1945-6.....		28,502	97.2		2.8
1944-5.....		118,590½	94.5		5.5

Of twenty-five re-inspected shortweight lots fourteen were confirmed, nine released as correct and two split up into correct and shortweight sub-lots.

### 3. UNFIT LOTS

A total of thirty-one lots of canned fish comprising 5,795 cases were found to be unfit for human consumption. Re-inspection was carried out on 4,190 cases of these and 2,075 cases were confirmed as unfit, while 2,115 cases gained higher grades.

### 4. ROUTINE SAMPLES

A total of 704 routine samples of at least three cans each, submitted by canners themselves, at any time, or collected by fisheries inspectors at the request of the Laboratory, were examined and reported upon. These serve to inform the canners of the quality and workmanship of their products, particularly at the beginning of the season or when they undertake the canning of new types of products. The samples included the following products: lobster 146, lobster paste 72, chicken haddie 64, herring 60, mackerel 59, sardines 58, clams 38, tuna 29, kippered snacks 26, gaspereau 19, sardines in tomato sauce 16, mackerel fillets 12, billfish 11, tomalley 9, bar clams 8, finnan haddies, cod livers, cod and pollock 7 each, smoked sardines and quahaugs 6 each, sardines in mustard and fish cakes 4 each, herring in tomato sauce, Atlantic salmon and shad fillets 3 each, silversides, flaked fish, gaspereau roe and smoked fillets 2 each, herring fillets, cod oil, oysters, clam bouillon, cod paste, chicken haddie in tomato sauce, fish chowder and mussels one each.

### 5. INSPECTION OF IMPORTED CANNED FISH

Samples from four lots of imported canned fish (salmon, shrimp, crab meat, abalone) were submitted by local Customs officials and examined by the Laboratory. One lot of crab meat was condemned as unfit for food.

### 6. FIELDWORK

The Shediac, N.B., Seasonal Laboratory, was operated from April 15 to October 4 with Mr. R. E. S. Homans in charge and the Charlottetown, P.E.I., Seasonal Laboratory from May 14 to October 4 with Mr. A. Hollett in charge. A canning technologist was attached to each of these Laboratories and visited all canneries in the two Provinces periodically throughout the canning season. They gave assistance to canners on technological problems, with a general improvement of the various packs in view, and consulted with local fisheries inspectors. The Director visited most of the Nova Scotian canneries in a similar capacity. Mr. Hollett made seven trips to the Magdalen Islands to carry out grading of canned fish there.

### 7. CANNING RESEARCH

Small experimental packs of canned billfish, silversides, whitefish, flaked fish from frozen fillets and herring in tomato sauce were prepared at the request of various firms to assist them in the development of new products.

Tests of commercial supplies of tomato puree for use in canning herring and sardines in tomato sauce have shown great variations in quality, especially specific gravity, colour and flavour. Some brands were considered unsuitable for sauces in fish canning.

### B. SANITARY CONTROL OF THE SHELLFISH INDUSTRY

The work covered five sections of the industry. Shellfish shucking plants in Halifax, Digby and Yarmouth Counties, N.S. and Charlotte County, N.B. were visited by the new mobile laboratory and bacteriological tests made on the water supplies, on clams in the shell and on the shucked meats, ready for shipment.

Similar inspections were made in the chilled lobster meat plants in the Division. The mobile laboratory has proven itself invaluable in the performance of this work.

Periodical tests were also made in the scallop meat plants at Digby, N.S. and improvements were noticed in the shipping of the scallop meats with the compulsory use of metal shipping containers.

A 12-day trip on a deep sea scallop dragger was made to study the conditions of handling and storing scallop meats at sea.

Bacteriological surveys were made in two Prince Edward Island areas to test their suitability as oyster relaying areas.

Mr. W. J. Brownlee, Bacteriologist-in-charge of the mobile laboratory, worked ten days at St. Andrews, N.B. in cooperation with the Department of National Health and Welfare Mobile Laboratory on their bacteriological clam investigations.

The Director and Mr. Brownlee attended meetings of the Inter-departmental Committee on Shellfish Control at Ottawa, of Department of National Health and Welfare and Fisheries Research Board officials at St. Andrews, N.B. and of U.S. Public Health Service, Department of National Health and Welfare and Department of Fisheries administrative officers at Saint John, thus assuring liaison and cooperation with the various organizations interested in sanitary shellfish control.

#### C. FROZEN FISH INSPECTION

Four of the frozen fish inspectors were seconded to the Chief Inspector, Central Division, Winnipeg, for a period of approximately four months, to assist in the inspection of fresh and frozen whitefish.

Other inspectors were assigned to various fresh and frozen fish plants in the Eastern Division to supervise sanitary conditions and quality control, and some were assigned administrative duties.

#### D. SALT FISH

During the year a total of 57 samples of dried salt fish were submitted to the Laboratory for moisture determinations by various salt fish firms and fisheries inspectors.

#### E. EDUCATIONAL

Educational efforts took up a considerable proportion of the time of the staff during the winter months. Courses given to fisheries inspectors during April 1947 and January and February 1948 included instructions on fish canning, cannery inspection, administration of canning regulations.

Three one week courses for fish cannery foremen were given by the Laboratory staff during March 1948. They were attended by twenty-nine cannery workers who declared them to be of great benefit in their future work.

The Laboratory staff prepared a canned fish cutting and grading demonstration at the East Coast Fisheries Conference at Charlottetown, P.E.I., April 2, 1947. Some 154 samples of Eastcoast canned fish and 60 samples of imported canned fish were opened and judged. The great variation in quality of the domestic packs was an eye-opener to most judges and visitors.

A similar demonstration was arranged at a meeting of New Brunswick cannery workers arranged by the Provincial Fisheries Director, at Shediac, N.B., on April 16, 1947.

#### F. LIAISON WITH TRADE AND ADMINISTRATIVE OFFICERS

The Laboratory has been in frequent contact with Divisional headquarters and when in the field, the Director and staff have kept in close touch with the Regional and Unit officers and local fisheries inspectors. Staff members attended the Annual Regional and Divisional Conferences.

The Director attended the annual meetings of the Prince Edward Island Fisheries Federation, New Brunswick Fish Cannery and Assemblers Association and the United Maritime Fishermen Ltd. He also attended meetings of the Cana-

dian Committee on Food Preservation at Ottawa, and of its Sub-committee on Fish, as Secretary, and the Annual Meeting of the Institute of Food Technologists at Boston, Mass.

The Laboratory was visited during the year by a number of distinguished visitors including Dr. T. Thorbarnarsson, chief of fisheries research in Iceland; Mr. F. Bramsnaes, Department of Fisheries, Copenhagen, Denmark; Messrs. S. G. Khars and G. Lorentzen, Ministry of Fisheries, Bergen, Norway; Messrs. Mitra and John, Department of Fisheries, India; Mr. N. D. Jarvis, United States Fish and Wildlife Service.



## REPORT ON OYSTER CULTURE WORK UNDER THE DEPARTMENT OF FISHERIES FOR THE YEAR 1947-48

*By R. R. LOGIE, Fisheries Research Board of Canada*

The Department of Fisheries and the Fisheries Research Board co-operate in carrying out investigations to improve the position of the oyster industry in the Maritime Provinces. The field headquarters is at the Prince Edward Island Biological Station at Ellerslie and the Board's investigator in charge of oyster investigations has the responsibility for the Department's programme as well.

The Department continued to provide its routine services to the industry. These included the examination and survey of new leaseholds and re-location surveys of established ones, the provision of seed stock in limited quantities and the prediction of spatfall. There was also a considerable call for advice on methods of culture and for the acceptance and transmission of such revenues as lease rental and royalty.

In addition to these services, examinations of two potential producing grounds were conducted and leasing policies were recommended for them. These areas are the Hillsborough River system in Prince Edward Island and Tracadie Lagoon in New Brunswick. Further new developments included the appointment of a Foreman, Shellfish Culture to be employed at Shippigan, N.B., and the initiation of steps to provide an experimental farm for this important area; the shipment of Bras d'Or Lakes spat and small oysters to Tracadie Lagoon to test their viability there; the commencement, at Ellerslie, of large scale trials of methods designed to lessen the cost of production of high quality oysters and trials of the feasibility of growing small oysters as a business.

### THE 1947 GROWING SEASON

The weather experienced in the Maritimes in the summer of 1947 was hot, dry and ideal for the propagation of oysters. As a result heavy sets occurred in all areas and in Prince Edward Island phenomenal catches of spat were made. The collectors put out by the Biological Station and by the commercial growers in the vicinity averaged between 50,000 and 60,000 spat per filler, whereas between 1,000 and 1,500 is a more usual figure. Catches of this magnitude are too heavy and result in the loss of many spat through overgrowth by their neighbours and in the eventual production of great numbers of small spat on thrashing. However the preceding three seasons had yielded only fair catches and the huge numbers now caught will go far towards re-stocking depleted leaseholds.

Due to the unusually long spawning season the marketable oysters were slow to recover their condition and, in the early fall, were thin and possessed a fragile growing edge. By mid-October they had fattened well and the growing edge had hardened sufficiently to resist the rigours of shipping. At the end of the fishing season the oysters were in prime condition, with hard shells and firm meats.

### THE 1947 FISHING SEASON

In Table 1 the catch for the 1947 fishing season is shown together with the comparable figures for 1945 and 1946. It should be noted that the total production of the Maritimes still enjoyed a gradual increase, although there were fluctuations in some areas by reference to the previous years' figures. It is difficult to account exactly for all such variations, but they were probably more closely related to fishing effort than to changing natural conditions. No major producing area suffered a serious decline.

The market continued to be good with no great losses in shipment or in storage. High quality oysters commanded high prices and late in the season an unexpected demand for the poorer grades cleared out all holdings of Standard and Substandard Shapes. This arose from the banning of shipments of shucked oysters from the States as part of the Government's currency conservation measures.

TABLE 1  
OYSTER PRODUCTION FROM ALL SOURCES  
(to nearest hundred barrels)

PRODUCING AREA	1945	1946	1947
Maritimes.....	35,600	35,300	38,200
New Brunswick.....	23,100	21,800	25,000
††Gloucester County.....	10,000	8,700	8,700
*Northumberland County.....	9,800	10,500	13,200
*Kent County.....	2,900	2,300	2,900
††Westmorland County.....	400	300	200
Prince Edward Island.....	7,200	9,600	10,200
††Prince County.....	6,000	7,700	6,500
††Queens County.....	1,100	1,500	3,700
††Kings County.....	100	400	....
Nova Scotia.....	5,300	3,900	3,000
††Bras d'Or Lakes.....	2,100	800	600
††Northumberland Strait.....	3,200	3,100	2,100

\* Largely or entirely public fishing.

† Public fishing and leaseholds.

† Leasing controlled by Federal government; Westmorland County only in part.

It is possible to estimate that roughly one-half the annual Maritime production comes from leaseholds.

#### THE DEPARTMENT'S WORK IN CONJUNCTION WITH THE BOARD

The Department's and the Board's efforts in this field are so closely integrated as to be not easily separable. Broadly speaking the Board assumes the task of discovering new methods through research and the Department provides the facilities for large-scale trials of their commercial practicability. All maintenance work and the administration of all routine procedures of oyster culture also lie in the Department's province.

In May, 1947 the writer and H. R. Found of the Department's staff conducted an examination of the Hillsborough River system in Prince Edward Island to discover to what extent the oysters of these rivers had recovered from the oyster disease which had devastated the area about 1937. It was found that the oysters were coming back strongly, but that each of the three rivers concerned presented a different problem. In Eliot (West) River native stocks were so well established that it would have been contrary to the Department's policy to allow leasing. It was accordingly recommended that only public fishing be allowed there. The waters of the whole of Yorke (North) River and those of the lower portion of Hillsborough (East) River are polluted and the oyster population therein was sparse and could only be exploited by re-laying. In the middle reaches of Hillsborough River there were considerable stretches of good oyster bottom which were either barren or supporting a small but increasing population. This river once was a heavy producer and there is no reason to suppose that it could not become so again, in view of the evidence of the good recovery being made by the native stocks. It could also provide the re-laying ground for oysters from the polluted waters of its own lower reaches and of Yorke River. Accordingly it was recommended that leasing be permitted in this portion of Hillsborough River but, in view of the small amount of suitable ground and the large number of interested parties a limit of two acres per lease was considered advisable. Already many applications are before the Department and the keen interest exhibited augurs well for the area.

In June, 1947 the writer and H. R. Found conducted a similar examination of Tracadie Lagoon in New Brunswick. There was much good oyster bottom almost completely devoid of oysters and the annual take of the entire Lagoon ran to only forty barrels. No conditions inimical to the culture of oysters of high quality could be discovered and the local sentiment was in favour of instituting a leasing policy and attempting rehabilitation of the area through the use of oyster culture methods. Accordingly a leasing policy with a limit of four acres per lessee was recommended to the Department. Supply of seed stock will constitute a problem but a start was made in the fall of 1947 by making a trial shipment of Bras d'Or Lakes stock to the area in order to check its adaptability to these waters.

At Shippigan, N.B., the problem continued to be the provision of a regular supply of spat. As a result of the Board's investigations for the past four years, the time was considered at hand for the attempt to demonstrate a practical method. Consequently a Foreman, Shellfish Culture, was appointed and the Department commenced negotiations to purchase a property for use as an experimental farm in the 1948 season.

At Ellerslie plans were made to test a mechanical device developed in the States for the control of the starfish, the oyster's chief enemy, through the use of quick-lime. One of these limespreaders was built and is ready for use in the 1948 season. Plans were also completed to attempt to catch spat without the use of costly floating equipment. The success of both these undertakings is problematical but either one would greatly contribute to lowering the current high cost of producing quality oysters.

The Department was still unable to satisfy the demand for small oysters (2-3 inches) for seeding purposes. Such oysters are a by-product of operations on the up-river beds in the Department's reserve in Bideford River. Since the quality of oysters grown to market size on the poorest of these beds is low, it seems reasonable to devote them to the production of small oysters only. The cleaning operations which are a necessary prelude to such an undertaking were performed on two beds in the summer of 1947 in preparation for planting with separated spat in 1948. If this attempt prospers it is hoped that some local growers will go into the business.

The revenue accruing from the Department's operations is shown in Table 2.

TABLE 2  
SOURCES OF REVENUE

Sale of seed stock	
Spat.....	206.50
Small oysters.....	565.00
Low grade culls.....	109.00
Marketable oysters.....	1,800.00
Services	
Thrashing collectors.....	8.00
Lease rentals.....	3,030.19
Royalties on oysters marketed.....	510.45
Total.....	\$6,229.14

#### THE BOARD'S WORK IN CONJUNCTION WITH THE DEPARTMENT

The details of this work are reported in the Annual Report of the Fisheries Research Board of Canada and only a brief statement will be included here.

Seasonal investigators were stationed at Shippigan, N.B., and Hardwicke, N.B. in the summer of 1947 to further the work of discovering workable oyster culture techniques for the Shippigan-Caraquet and Miramichi Bay areas. In the former case encouraging progress was made, but in the latter results were negative and a new line of attack has been planned for the 1948 season.

At Ellerslie experiments were conducted on the factors affecting oyster growth and the nature of the oyster disease. Results were interim only and it is too early to make any positive statements.



## ANNUAL REPORT ON FISH CULTURE

By C. J. ATKINSON, for Director of Fish Culture

Fish cultural operations in 1947 were carried on by the Department of Fisheries in Nova Scotia, New Brunswick and Prince Edward Island, where the fisheries are entirely, or to a large extent, under federal administration. Thirteen main hatcheries, six rearing stations, six salmon retaining ponds and several egg collecting camps were operated with a total output from these establishments of 28,075,670, over 80 per cent of which was distributed in the fingerling and older stages. Distributions were made to over 1,000 different lakes and streams. The output by species, hatcheries and provinces was:—

STATEMENT BY SPECIES OF THE FISH DISTRIBUTED DURING THE YEAR  
ENDED DECEMBER 31, 1947

—	Fry	Advanced fry	Fingerlings	Yearlings and older	Total distribution
<i>Salmo salar</i> -Atlantic salmon.....	350,000	2,951,410	7,517,126	6,257	10,824,793
<i>Salmo fario</i> -Brown trout.....			103,107		103,107
<i>Salmo irideus</i> -Rainbow trout.....			16,966	57	17,023
<i>Salmo salar sebago</i> -Sebago salmon..			2,980	59,971	62,951
<i>Salvelinus fontinalis</i> -Speckled trout..	150,000	2,076,360	14,751,698	89,738	17,067,796
	500,000	5,027,770	22,391,877	156,023	28,075,670

(For additional tables see pages 61 and 62)

Nutritional experiments were continued with speckled trout fingerlings. Rations that proved least efficient in the past were discarded and some new ones tried. Twenty-six tests were made and 16 diets used made up of 12 ingredients. Some of the diets gave promising results from the standpoint of survival, growth, and cost of food to produce a pound of fish.

In continuation of the Charlotte County Lakes experiment, a co-operative effort between the Fish Culture Branch and the Atlantic Biological Station of the Fisheries Research Board, creel censuses were taken in St. Patrick and Gibson Lakes. Gibson Lake was stocked with 7,700 fingerlings and 770 yearling speckled trout and Crecy Lake with 6,750 speckled trout fingerlings and 675 yearlings—all

Lakes	Census year	Per acre (Pounds)
Limeburner.....	1942	0.40
	1943	0.08
Bonaparte.....	1942	0.87
	1946	0.61
Johnson.....	1941	0.98
	1942	0.10
Kerr.....	1941	0.36
	1942	0.14
	1945	0.17
St. Patrick.....	1943	0.71
	1944	0.94
	1946	0.76
	1947	0.39
Crecy.....	1943	2.14
	1944	1.31
	1946	1.46
Welch.....	1944	0.59
	1945	0.07
Gibson.....	1944	0.74 (salmon and trout)
	1945	0.54 (salmon and trout)
	1947	1.09 (salmon and trout)



# REPORT OF THE DEPUTY MINISTER

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HATCHERIES AND REARING STATIONS OPERATED, THEIR LOCATIONS, DATES ESTABLISHED, THE SPECIES AND THE NUMBERS OF EACH SPECIES DISTRIBUTED FROM EACH ESTABLISHMENT DURING 1947

Estab- lished	Hatchery	Location	Species	Fry	Advanced fry	Fingerlings					Year- lings and older	Total dis- trib- ution by species	Total dis- trib- ution by hatcheries
						No. 1	No. 2	No. 3	No. 4	No. 5			
1929	Antigonish	St. Andrews, N.S.	Atlantic salmon.		565,000	510,000	137,500	285,000	95,000	6,340	8,587	647,500	4,637,427
1876	Bedford	Bedford, N.S.	Speckled trout.			2,500,000	550,000	103,180				4,009,927	103,180
1937	Cobequid	Collingwood, N.S.	Atlantic salmon.			110,000						110,000	213,180
1938	Coldbrook (J)	Coldbrook, N.S.	Speckled trout.		278,500	167,500	117,500	15,500	27,750	15,000	7,920	133,000	541,679
1936	Grand Lake (J)	Wellington Station, N.S.	Brown trout.				4,000	35,000	68,107			103,107	674,679
			Speckled trout.					212,000	25,000		4,547	140,000	243,107
			Atlantic salmon.								37,282	216,547	
1937	Kejimikujik (J)	New Grafton, N.S.	Speckled trout.				222,750		170,010		39,600	39,600	293,429
1912	Lindlof	St. Peters, N.S.	Atlantic salmon.			532,450			11,639			170,010	404,399
1902	Margaree	Frizzleton, N.S.	Speckled trout.	15,000		1,075,000	251,400	40,600		1,531		532,450	
1935	Mersey River (J)	Liverpool, N.S.	Atlantic salmon.			1,370,000						1,381,591	1,914,041
1913	Middleton	Middleton, Annapolis County, N.S.	Speckled trout.			794,000	177,000	43,000	85,700	80,200	5,408	1,370,000	2,555,308
			Atlantic salmon.				182,000	81,000				182,000	
			Speckled trout.									81,000	263,000
1933	Nictaux Falls (J)	Nictaux Falls, N.S.	Atlantic salmon.			76,880	530,860	185,000	49,500			185,000	1,120,430
1929	Yarmouth	South Ohio, N.S.	Speckled trout.			20,000		278,210				935,430	
1939	Charlo	River Charlo, N.B.	Atlantic salmon.		411,000	111,720			139,000			5,000	25,000
1928	Florenceville	Florenceville, N.B.	Speckled trout.			654,730	717,580	37,160	27,700	5,000		250,720	
			Speckled trout.		860	946,090	5,000	10,020			1,205	1,135,590	1,380,310
			Atlantic salmon.			315,000	80,000					1,063,670	
			Seabago salmon.									31,225	1,694,895
1880	Grand Falls	Grand Falls, N.B.	Speckled trout.		749,000	963,000	2,500		30,700		13,600	3,600	
1874	Miramichi	South Esk, N.B.	Atlantic salmon.	350,000	280,000	30,000	621,530				19,750	1,764,000	
1914	Saint John	Saint John, N.B.	Speckled trout.	150,000	10,000	322,500	1,000	829,470				134,530	
			Atlantic salmon.		2,214,000	184,800	280,680					1,312,970	2,644,500
			Rainbow trout.			341,000	35,000	57,326				2,885,480	2,683,480
			Seabago salmon.				15,910				1,710	435,236	
1938	Cardigan (J)	Cardigan, P.E.I.	Speckled trout.		40,000	2,437,910	684,500	2,980			57	12,069	
			Atlantic salmon.						16,000	23,500	9,089	3,222,108	3,685,380
1906	Kelly's Pond	Southport, P.E.I.	Rainbow trout.				1,056					46,060	
			Speckled trout.		457,410	75,000	248,417	181,032	10,000			1,056	
			Atlantic salmon.		7,000	415,600						514,449	561,565
			Speckled trout.									457,410	
				500,000	5,027,770	14,020,360	4,975,363	2,510,008	744,467	141,679	156,023	28,075,670	28,075,670

Rearing station.  
The fry and fingerlings included in this distribution were from collections in the autumn of 1946 and the spring of 1947.



marked fish. The creel census returns of 1947 again indicated poor productivity with yields per acre varying from 0.39 to 1.09 pounds. Dr. M. W. Smith, of the Atlantic Biological Station, St. Andrews, N.B., reports the catch by anglers in these lakes in table at bottom of page 60.

The work on the Charlotte County Lakes was extended co-operatively to the following waters with results by Dr. Smith as given below.

Lakes	Census year	Catch by anglers per acre (pounds)
Black, N.B.....	1946	0.4
Copper, N.S.....	1945	1.0
	1946	1.1
	1947	0.6
Lower O'Law, N.S.....	1945	0.7
	1946	0.5
	1947	0.5
Upper O'Law, N.S.....	1945	0.1
	1946	0.1
	1947	0.1
Sutherland, N.S.....	1945	3.8
	1946	2.1
	1947	1.9

Assistance was also given the Fisheries Research Board in their study of trout production in Prince Edward Island, Atlantic salmon in the Petitcodiac area, N.B., and in the Shubenacadie District, N.S.

Selective breeding of speckled trout was continued to develop such characteristics as increased vitality, high yield, rapid growth, early spawning, colouration and general appearance. Outstanding pairs at different hatcheries were mated and their progeny segregated. The progeny of the pairs, in which survival is highest, is retained for brood stock and periodically selected so long as they are profitable egg producers. The average yield of the selected pairs and of the general groups is indicated in the reports of the respective hatcheries.

From Lakes Utopia and Wheaton, Charlotte County, N.B., 39 adult small mouthed black bass were transferred to Victoria Lake, Queens County, N.S., and 4 to Shaws Lake, Saint John County N.B. Through the courtesy of the Restigouche Riparian Association nearly 1,200,000 Atlantic salmon eggs were secured from the Restigouche River and laid down in Charlo hatchery. Brown trout fingerlings were again introduced into the Cornwallis River, N.S. The land at Haley Brook, a tributary of the Tobique River, N.B., was cleared in preparation for the establishment of new rearing ponds. During the year, at the regular salmon ponds 3,635 parent Atlantic salmon were impounded. The average yield of eggs per female was 8,034 and for the individual ponds: Morell, 7,222; New Mills, 7,597; Miramichi, 7,114; River Philip, 9,258; Sackville, 3,889 and Margaree, 10,038.

Displays of live fish were made at exhibitions held at Yarmouth, Lunenburg, Middleton and Folly Lake.

The Canadian National Railways, the Canadian Pacific Railway and the Dominion Atlantic Railway companies continued their generous assistance and co-operation by furnishing free transportation for shipments of game fish and game fish eggs with their attendants. The extent of this co-operation is indicated in the following summary:

Railway	Total mileage on trip passes	Number of passes	Mileage on baggage car permits			Number of cases or cans			Number of permits
			Full	Empty	Total	Full	Empty	Total	
C.N.R.....	5,155	48	3,185	2,368	5,553	350	339	689	49
C.P.R.....	5,255	52	3,144	2,935	6,079	401	401	802	57
D.A.R.....	1,556	12	892	892	1,784	42	42	84	16
	11,966	112	7,221	6,195	13,416	793	782	1,575	122

NOTE.—Number of passages refers to transportation one way—a return trip counting as two passages. Number of permits refers to one way passages for cases or cans.



Mr. J. A. Rodd, I.S.O., Director of Fish Culture, retired in May after 46 years' faithful and efficient service. He had made significant contribution to progress in North American fish culture. He first joined the staff of the old Department of Marine and Fisheries in 1901 and became Director of Fish Culture in 1914, succeeding Mr. F. H. Cunningham. Mr. Rodd was a member of the Federal Fisheries Research Board and joint chairman of the National Committee on Fish Culture. He was a past president of the American Fisheries Society which he has also served as an executive member, committee chairman and as a member of its special committee appointed to formulate a North American Fish Culture policy. He was a member of the Advisory Board on Wildlife Protection (Canada) and acted as Canadian member of the International Fact Finding Commission appointed to make investigations of the Missisquoi Bay—Lake Champlain fisheries. He was also active as a member of the Professional Institute of the Civil Service and past vice-president of that body. On retiring from the Department he was made a life member of the Institute. He is a fellow of the Canadian Geographic Society, holder of the Silver Jubilee and Coronation medals and in the King's honours list of 1946 was awarded the Imperial Service Order.

Operations generally at each establishment are referred to in the accompanying officers' reports. Collections, transfers and distributions are given to the nearest hundred in the summaries of operations at the respective establishments.

## MARITIME PROVINCES

### *Regional Supervisor of Fisheries, James Catt*

In spite of general high temperatures resulting from a drought commencing early in the summer and becoming acute in the fall, hatchery output in 1947 was of excellent quality and rearing losses were not excessive.

A meeting of officers of the Fish Culture branch of the Department was convened April 10 and 11, at Saint John, and amongst other matters of importance discussed were the values of diverse diets and quantities of food necessary to improve the quality of ova produced from speckled trout brood stocks. Suggestions in this connection when implemented appear to have had very satisfactory results—at least in producing a higher percentage of fertile ova.

Ova collections were made from Atlantic salmon, landlocked salmon, speckled and rainbow trout. These were augmented by the receipt of small quantities of brown and rainbow trout eggs.

Atlantic salmon ova were obtained from fish retained at the Margaree, Morell, Miramichi, River Philip, Sackville and New Mills ponds, and from fish seined in the Little Main Restigouche River. Total salmon egg collections did not come up to expectations which was largely due to the drought that forced fish to spawn on the River Philip reaches below the trap, and the run of fish from the pools in the Restigouche to the spawning grounds unexpectedly early. Many fish were spent when taken in the seine.

Landlocked salmon eggs were obtained from brood stock at Grand Lake rearing station, from wild fish taken in Waverley Run and Rawdon River, N.S., and from Clinch Brook, N.B. The spawning brook at Chamcook Lakes was completely dry and with no collection being made at this point resulted in a smaller-than-usual total collection of the species.

The number of speckled trout eggs obtained from parent hatchery stocks was entirely satisfactory but drought prevented the projected collection from wild trout at Trout Brook, N.B. The only ova obtained from wild fish were therefore those taken at McRae's Lake in Cape Breton and by the Research Board in Ellerslie and West Rivers, P.E.I.

A small collection of rainbow trout eggs was obtained from parent fish reared at Saint John hatchery.

Collections and distributions of wild fish included small mouthed black bass and speckled trout. The bass were taken with some difficulty in the Magaguadavic



watershed and Wheaton's Lake, N.B. Thirty-nine were transferred to Victoria Lake, Queens County, N.S., and four were liberated in Shaw's Lake watershed, N.B. Speckled trout taken in McRae's Lake were transferred to Lindloff Lake, Cape Breton whilst those taken near Ellerslie, P.E.I., were released in Cardigan River.

A partial survey of spawning grounds indicated that conditions for natural seeding by salmon were good in larger streams. The rudds—made during low water—were not in danger of damage by frost, a hazard that must be considered when high water permits the fish to spawn on shallows that subsequently become exposed. Speckled trout and landlocked salmon were less fortunate. Many streams normally affording good spawning grounds were dry or too low to permit of their use by the fish which therefore were forced to spawn in less suitable areas.

Results of stocking, in so far as could be determined, were very satisfactory and were of great interest. Early in the season many heavy brown trout were taken on the Mispék and Little River watersheds. Distributions of this species made in Guysborough River, N.S., some years ago, at one time were considered to have failed in their purpose but it is now proved that these exotics have not only been successfully established but have produced both residual and anadromous strains of which the latter has now spread to the Salmon River, Guysborough County, N.S. Specimens up to 8 pounds in weight are reported to have been taken in both fresh and salt water last year by both resident and tourist anglers. Rainbow trout planted in Big Salmon River, N.B., are doing well both in the main river and in Dick's Lake on its Falls Brook tributary. Fish taken early and late in the summer and late had reached maturity and spawned in the spring. Although lacking positive proof there is not any reasonable doubt but that rainbow trout reached maturity in Sherbrooke Lake, Lunenburg County, N.S. Large numbers of the same species were captured in Rumsey and Sunken Lakes, N.S. A number of small mouthed black bass were captured in Doctor's Lake—Minto Lake area near Yarmouth, N.S., and it is reported that many were taken in Millers Pond, Grand Manan.

An excellent spirit of co-operation continued to obtain between the Administrative and Fish Culture branches of the Department. Assistance when requested was given Administration officers in investigation of infractions of the fishery regulations. These officers in turn supplied much valuable information, assisted in distributions and co-operated in obtaining data in regard to the salmon run on Big Salmon River, N.B., etc.

Discussions with the personnel of various departments of the Provincial Governments and the exchange of information proved both interesting and valuable.

Discussions, correspondence and field work with the directors and staffs of the Fisheries Research Boards' stations at Saint Andrews and Halifax resulted in planning procedures which, through close co-operation, were and are being implemented. These included the transfer of 2,006 speckled trout yearlings from Saint John to Kelly's Pond, P.E.I., the transfer of sea-run and residual speckled trout from Ellerslie, P.E.I., to the Cardigan rearing ponds where they were retained until spawning time, stripped and released, transfer and distribution of 270,000 Atlantic salmon August fingerlings from the Miramichi and Cobequid hatcheries to the Middle Pollett River and investigations into the apparently adverse results of fertilization of McFadden Lake as carried out by private owners.

Following discussion, rearing pond facilities at Grand Lake, N.S., and salmon stocks were made available to Dr. A. G. Huntsman. At his request kelts from Sackville River were transferred to other watersheds.

The co-operation of the various branches of the Fish and Game Protective Associations of New Brunswick and Nova Scotia is keenly appreciated. Many of them were of material assistance in distributing salmon and trout stocks. The Saint John branch had a road bulldozed into Round Lake to facilitate future distributions in that area, and a plane was chartered to transfer speckled trout fingerlings to the water before the road was completed.

Exhibits of live fish were made at Yarmouth and Lunenburg. These as usual proved one of the exhibition's major attractions. Search for suitable hatchery and rearing pond sites was continued with particular attention to southwestern Nova Scotia. The results were not encouraging. Data obtained on selected sites indicated, by the end of the summer, that water temperatures were too high to assure successful operation, although volumes were adequate.

In view of increasing demands for angling during July and August by tourists and residents who then take their vacations, it has become apparent that the introduction of exotic species should be further considered. In late summer speckled trout are not readily caught but good angling for small mouthed black bass, rainbow and brown trout may then be had. Accordingly, a survey to determine waters completely suitable for their introduction was commenced.

Owing to shortage of labour and supplies an extensive programme of new construction and major repairs could not be completed although good progress was made. A double garage and workshop with storage space was built at Grand Lake. At Kejimikujik a store house and office building was brought to near completion. At Lindloff a new dam was constructed, pipe line partly laid and a concrete floor completed in the office. A double garage, workshop and cold storage space was completed at Margaree; a cement floor was laid in the hatchery, the barn reroofed and major repairs to the ponds completed. Four new concrete ponds were built at the Mersey plant. A mink proof fence was erected at Yarmouth. The dam at Florenceville was refaced and a workshop, feed room and cold storage building was brought well forward towards completion.

Hydro service was brought to Grand Falls hatchery where a workshop, double garage and cold storage building was constructed. Hardwood floors were laid in the Saint John dwelling, a cold storage building and an ice house built, extensive repairs made to the ponds and a long new drain pipe laid to prevent water from the vicinity of the chlorinating plant entering the pond system. Work was commenced in developing rearing ponds at a new site on Haley Brook, Tobique River, N.B.

*Senior Fisheries Inspector, F. A. Tingley*

Considerable aid was given in February and March to the Saint John Branch of the New Brunswick Fish and Game Association in construction and maintenance of a dam at the outlet of Round Lake to prevent ingress of undesirable species. Its fish population had been destroyed by poisoning in 1946—a project sponsored by the Association. Victoria Lake in Queens County, N.S., was examined to determine its suitability for small mouthed black bass and was stocked with 39 adult fish of this species on June 10 from Utopia and Wheaton Lakes, Charlotte County, N.B. From July to November, investigations of Big Salmon River were made with respect to both the Atlantic salmon run and the survival of rainbow trout. Specimens of the latter species that had spawned in the spring of 1947 were captured. The largest, about 1½ pounds in weight, presumably were survivors of the first stocking in 1944. None of the trout observed were marked and therefore belong to the Cape Cod group which comprised 83 per cent of the original stocking. The balance of this stocking consisted of approximately 10 and 6 per cent of Crooked Creek and Misouri (autumn spawning) stock respectively. Weirs were installed in July for measuring the flow of Haley Brook, Victoria County, N.B., and of Greenwood Lake outlet, Shelburne County, N.S. Reports covering the examination of Brown Lake, York County, and Clark Lake, Saint John County, N.B., were submitted. Observations were made on McGregor Lake, Cape Breton County, and on Guysborough, Salmon and New Harbour Rivers in Guysborough County, N.S. Assistance was given the Fisheries Engineer in construction of a salmon trap in the fishway at the Tide Head Dam on Big Salmon River. Assistance was also rendered in the distribution of Atlantic salmon fingerlings for the stocking experiments conducted by the Fisheries Research Board in the Middle Pollett River and in connection with the Department's Fish Culture Exhibits at the Nova Scotia Fisheries Exhibition at Lunenburg. A fyke net was constructed and set in an effort to capture parent



speckled trout at Trout Brook, Lake Utopia but owing to continuous low water throughout the season no fish were taken. The sebago salmon spawning grounds in the stream connecting the Chamcook Lakes were kept under observation but this stream remained dry throughout the normal spawning season, and no ova collection was made. Other operations included repairs to nets, attendance at the Saint John Fish Culture Conference and inspection of Grand Falls and Florenceville Hatcheries.

*Senior Fisheries Inspector, A. P. Hills*

The Fish Culture Conference at Saint John, N.B., was attended April 10 and 11. Inspections of the following hatcheries and ponds were made: Antigonish, Lindloff, Margaree, Miramichi, Charlo, Grand Falls, Florenceville, Yarmouth, Middleton, Nictaux, Bedford, Cobequid, River Philip, Kelly's, New Mills, Mersey, Kejimikujik, Stevens, Coldbrook, Grand Lake, Cardigan and Margaree pond—15 of them were visited twice. Investigations in connection with rainbow trout plantings in Sherbrooke, or Nine Mile Lake, Lunenburg County, N.S., were carried out in June, August and September. Assistance was rendered in connection with investigations at Pollett River in the Petitcodiac system, at McFadden Lake and Big Salmon River, and with local collections of black bass. Sites for rearing ponds at Haley Brook and points on the Tobique River, were inspected as well as lakes in the Island Lake area, Campbellton District. Aquaria were set up and exhibits arranged for the Lunenburg Fisheries Exhibition in September. During the latter half of October, supervision was carried out of the capture of parent salmon and stripping operations on the Restigouche River, N.B.

ANTIGONISH HATCHERY

*W. D. Turnbull, Superintendent*

The hatchery ponds between November 1 and 28 produced 12,488,800 speckled trout eggs which were laid down for incubation in Antigonish hatchery. This collection was supplemented by receipt in March of 700,000 Atlantic salmon eyed eggs from Kelly's Pond hatchery and in November by 206,000 speckled trout eggs in the green stage from Saint John. Speckled trout eggs were transferred during February and March to the following hatcheries, Bedford, Middleton, Cobequid and Yarmouth each 2,000,000; Grand Falls and Florenceville each 100,000 and Kelly's 1,000,000—and in November, Saint John 100,000. Forty thousand speckled trout fingerlings were sent to the Grand Lake rearing station in October and December. Distributions for the year were 647,500 Atlantic salmon and 4,010,000 speckled trout of which 500 of the latter were marked by fin clipping and distributed by Dr. Beatty in Round Pond in the Musquodoboit area. Forty trout, 2 years of age, were placed at the disposal of Dr. E. C. Black, Dalhousie University in June in connection with his research work on this species. In selective breeding, 18 pairs of 2 year old trout averaged 2,643 eggs per female as against 1,346 in the general group of the same age; likewise 28 pairs of 3 year old trout average 3,060 eggs per female as against 1,802 in the general group and 5 pairs of 4 year old trout 3,682 as against 2,510 in the general group. The dietary experiments for fingerlings and brood stock had to be discontinued shortly after they were started on account of the extremely low water and scarcity of food. The exceptionally dry summer and autumn had its effect on the amount of water available for hatchery use and necessitated much dredging of the South River bed. The reserve supply of water in South River Lake helped to relieve the situation at first but was insufficient to last the prolonged drought. The hatchery walks and road were given a coat of gravel during the summer and the roof of the main hatchery building was repaired. The Fisheries Inspectors rendered valuable assistance especially in distribution of fingerlings and adult trout. Very good fishing was reported from areas served by this hatchery.

## BEDFORD HATCHERY AND SACKVILLE RIVER SALMON-RETAINING POND

*George Healley, Superintendent*

Receipt of eggs in February amounted to 2,000,000 speckled trout from Antigonish and in November 175,000 Atlantic salmon from Sackville pond and 768,000, same species, from River Philip. In May and June shipments of young fish to the rearing stations were made; 300,000 speckled trout to Coldbrook, 100,000 same species and 200,000 Atlantic salmon to Mersey, and 260,000 Atlantic salmon to Grand Lake. Forty-three thousand two hundred Atlantic salmon eggs were retained for research work at Dalhousie University as required. Distributions direct from Bedford for the year were 103,200 Atlantic salmon and 110,000 speckled trout. The sill under the entire east wall of the Bedford hatchery was renewed and studs and posts refooted. The stripped area of the wall was shingled and painted and minor repairs made as required. The Bedford hatchery truck was used to transfer fish to and from Grand Lake and Coldbrook ponds, to move trout from Antigonish to Grand Lake, to move equipment from Ordinance Corps, Halifax, to River Philip pond and to assist the Fisheries Research Board by transferring marked Atlantic salmon from Sackville River and sebago salmon from Grand Lake. A general increase on the spawning grounds is reported for Atlantic salmon and a general improvement in nearly all waters stocked. The fullest co-operation was received from fisheries supervisors and fish and game associations. The lowest water level in the rivers for 75 years was reported.

At the Sackville River pond between September 23 and November 3, seventy-seven Atlantic salmon averaging  $4\frac{1}{2}$  pounds in weight were taken, of which 45 females were stripped November 6 to 14 yielding 175,000 eggs for Bedford hatchery. One Atlantic salmon bearing tag No. K 3893 was recaptured November 6 in the Sackville River. This salmon had been tagged and released in Kinsac (Long) Lake in 1946. Sixty-five salmon kelts were marked with tags of the series K 3999—K 4087 and liberated, 24 in Long Lake (Kinsac) and 41 in Grand Lake. An additional pocket was added to the fish ladder to enable migrating salmon to enter the trap during low water.

## COBEQUID HATCHERY AND RIVER PHILIP SALMON-RETAINING POND

*P. B. Stratton, Superintendent*

From October 20 to November 28 two million five hundred and eighteen thousand speckled trout eggs were collected from the hatchery ponds. This collection, which was nearly 4 times that of last year, was augmented by receipt of 2,000,000 eggs of the same species from Antigonish in March, and 2,907,600 Atlantic salmon eggs from River Philip in November. In March 500,300 Atlantic salmon eggs were sent to Saint John hatchery. Distributions from Cobequid for the season were 541,700 speckled trout and 133,000 Atlantic salmon of which 10,000 salmon were marked by removal of the adipose fin before being liberated in Pollett River. The fish and game associations and fisheries supervisors rendered every assistance possible when called upon. Assistance and salmon stock were given in connection with experimental plantings to tributaries of the Pollett River. Repairs were made to ponds, pipeline and waste ditches as necessary.

Repairs to the washout at the west end of the River Philip dam were completed September 25. Extremely low water conditions delayed the ascent of salmon until freshets raised the water level during the second week in November. Five hundred and five salmon were taken averaging 15 pounds between October 3 and November 25. From 397 females stripped November 10 to 25, three million six hundred and seventy-five thousand six hundred eggs were secured—over double the number taken the previous year—and laid down 2,907,600 in Cobequid and 768,000 in Bedford hatchery. Assistant R. H. Webber from Bedford hatchery was in charge of collecting operations under the general supervision of Superintendent, P. B. Stratton.

## COLDBROOK REARING PONDS

*Ernest Barrett, Superintendent*

After opening on May 1 repairs to the pipeline and crib work were completed and the usual work of relining the pond with gravel and disinfecting with HTH was



carried on in preparation for receipt from Bedford hatchery between May 21 and 30 of 300,000 speckled trout advanced fry and fingerlings and from Nictaux (Middleton) May 23 and 24 of 125,500 brown trout fingerlings. Fifty speckled and 75 brown trout fingerlings were exhibited at Lunenburg Exhibition September 16 to 20. With the assistance of the Bedford staff and truck 140,000 speckled trout and 103,100 brown trout were distributed. Members of the Kings County Fish and Game Association rendered assistance at distributing time and fishery officers co-operated. Improved trout fishing is reported from the different lakes and rivers of the district.

#### GRAND LAKE REARING PONDS

*W. H. Cameron, Superintendent*

Bedford hatchery in June supplied 260,000 Atlantic salmon and Antigonish in October and December 40,000 speckled trout fingerlings. Operations at Rawdon River and Waverley Run in November resulted in a catch of 15 sebago salmon, averaging 2.6 pounds in weight, 8 of which were females yielding 13,000 eggs. Of the 26 caught in the traps 6 or 23 per cent bore the Grand Lake pond mark. In addition, anglers reported 503 marked seabagos during the year, 205 from Grand Lake, 3 from Long Lake (Kinsac) and 295 from Lake William. The 15 above mentioned were this year tagged with the series K 4982—K 4996 and liberated on November 29 in equal numbers to Grand Lake, Beaver River and Kinsac Lake. At the hatchery ponds 381 sebago females in November produced 84,750 eggs. Distributions for the season were 39,600 speckled trout, 216,500 Atlantic salmon and 37,300 sebago salmon of which 200 Atlantic and all sebago salmon were marked by fin clipping. The marked Atlantic salmon were planted in Beaverbrook River and the marked sebago salmon in Grand Lake. Three hundred and forty-six Atlantic salmon 1 year, 16 sebago fingerlings, 40 sebago 1 year and one sebago 3 year's old were allotted to Dr. A. G. Huntsman for distribution and experimental purposes. Fourteen sebago 5 and 6 years and 65 Atlantic salmon one year were forwarded Dr. E. C. Black, Dalhousie University for experimental purposes. Seventy sebago salmon, fingerlings, 1 year and 4 year stock, were displayed at the Lunenburg Exhibition September 16 to 20. A double garage and workshop with storage space on the second floor was constructed. The circular and long ponds and the intake pipe were repaired. Good reports were received from waters stocked with speckled trout. Assistance in making several distributions was given by members of the Dartmouth, Halifax, and Colchester (Truro) Fish and Game Associations.

#### KEJIMKUJIK REARING PONDS

*T. K. Lydon, Superintendent*

In May 400,000 speckled trout and in June 200,000 Atlantic salmon fingerlings were received from Nictaux (Middleton) hatchery. From these 234,400 trout and 170,000 salmon were distributed. A new office-storehouse was built and the fence around the ponds replaced. One trout with missing left pectoral fin was recaptured on September 3 in Louis Brook. Assistance in connection with the distributions was given by the Lunenburg Branch of the Fish and Game Association and by the Fishery Inspector.

#### LINDLOFF HATCHERY

*W. T. Owens, Superintendent*

Speckled trout egg collections in October, November and December amounted to 338,400 from the hatchery ponds and 48,400 from McRae Lake. In March 600,000 Atlantic salmon eggs and in November 1,249,300 eggs same species were received from Margaree hatchery and pond respectively. Distributions for the season amounted to 1,381,600 speckled trout and 532,450 Atlantic salmon. Five hundred and twenty-one adult speckled trout were transferred from McRae Lake to Lindloff Lake. Construction carried out during the year consisted of the completion of the new dam, the culvert of which was laid in 1945. Two wings were built—one 25 feet and one 69 feet nine inches long and nine feet high, on a base

12 inches thick and five feet nine inches wide. A new gate box 12 inches thick by three feet square was also included in the dam to take care of the new 16 inch wood supply pipe which is being carried out into the lake approximately 150 feet in order to secure cooler water for the hatchery supply. The stable on the shore of the lake was moved to higher ground before the new dam was constructed. The District Superintendent of Highways for Richmond County co-operated by supplying one of his department's machines for moving the building. New sills, concrete corner posts and temporary centre posts were installed and the exterior of the building repaired and painted. The Department of Highways also loaned one of their bulldozers and an operator to make several hundred yards of fill required on the dam.

Angling in most of the waters stocked was reported to have been good during the early part of the season with the best fishing in Catalone, Stewart, Loon and Blacketts Lakes in Cape Breton County, and Mary Anns, Grand, Seaview and the Lindloff Lakes in Richmond County. Lindloff Lake which has been stocked with adult wild trout transferred from McRae Lake during the past several years furnished the best fishing observed in a number of years. The River Tillards had a good run of sea trout during the first part of July. Fishery officers co-operated in making distributions when requested.

#### MARGAREE HATCHERY

*J. W. Heatley, Superintendent*

The hatchery ponds produced 1,343,800 speckled trout eggs October 24 to November 29 which collection was supplemented by receipt of 3,780,000 Atlantic salmon eggs in November and December from Margaree salmon pond. Outgoing shipments of Atlantic salmon eggs consisted of—in March and April, 500,000 to Yarmouth, 600,000 to Lindloff, 700,000 via Middleton to Nictaux and in November 30,000 to Dalhousie University. Distributions for the season were 1,370,000 Atlantic salmon and 1,185,300 speckled trout. In selective breeding 11 pairs of three year old speckled trout yielded 1,490 eggs per female as against 617 in the general group of the same age and 7 pairs of 4 year old select trout 1,477 as against 690 in general group. Pond No. 1 Series B was lengthened and completely rebuilt with concrete walls and ends, and temporary repairs were made to pond No. 2 in the same series. A concrete floor was laid in the hatchery and new supply and foot troughs built. The roof of the barn was shingled. A combined garage-workshop and cold storage building was constructed on land across the brook from the hatchery and a connecting foot bridge built.

Good trout angling was reported in Lake O'Law, Margaree, North River and Little Narrows districts. Survival of trout previously planted in Ethel Lake, Saint Paul's Island was reported good. Excellent co-operation was received from the fisheries inspectors and unit officers. A closed circulating system was set up with a view to speeding up development of trout eggs through the delicate stage.

#### MARGAREE SALMON-RETAINING POND

*J. P. Chiasson, Superintendent*

In accordance with the usual practice, the salmon for this pond were purchased from the Margaree Harbour Salmon Fisheries Association. Preparations began September 22 and consisted of cleaning the pond and building a pontoon. The net was fished continuously from October 3 to 23 taking 700 salmon averaging 10.5 pounds. From 501 females stripped November 13 to December 4, eggs totalling 5,029,300 were taken and allotted 3,780,000 to Margaree and 1,249,300 to Lindloff hatchery. This is the best collection at this pond since 1939.

#### MERSEY RIVER REARING PONDS

*C. E. Harding, Superintendent*

Between May 29 and June 16, one hundred thousand speckled trout and 200,000 Atlantic salmon advanced fry and fingerlings were received from Bedford hatchery. The output for the season was 182,000 salmon and 81,000 trout. Four concrete



ponds were constructed and some repairs made to the retaining pockets in the fishway. Considerable assistance was rendered during distributions by the fisheries inspectors, members of the Queens County Fish and Game Protective Association and the staff of the Nova Scotia Power Commission. A distinct increase in speckled trout was reported in waters previously stocked.

#### MIDDLETON HATCHERY, STEVENS PONDS AND NICTAUX REARING STATION

*F. M. Millett, Superintendent*

Eggs received during the year were—in January, February and March 194,200 brown trout from the New York Conservation Department, Mumford, U.S.A., 100,000 speckled trout from Saint John, and 2,000,000 same species from Antigonish; in November and December 1,005,200 speckled trout from Saint John, 103,900 rainbow and another 100,000 brown trout from Mumford. Fingerlings received from Nictaux in June were 7,500 speckled trout and 387,600 Atlantic salmon. Outgoing shipments of fry to Nictaux in March and April were 511,100 speckled trout and 172,500 brown trout. Distributions for the season were 935,400 speckled trout and 185,000 Atlantic salmon. Excellent results are apparent in Rumsey Lake from stocking with rainbow trout. One thousand speckled trout fingerlings were on display at the Middleton Exhibition July 1. The Fish and Game Associations and fisheries supervisors co-operated by giving their usual assistance.

Nictaux rearing station, in addition to what are mentioned above, received in April 700,000 Atlantic salmon eyed eggs from Margaree hatchery. Outgoing shipments of fingerlings in May and June consisted of 400,000 speckled trout to Kejimikujik, 125,500 brown trout to Coldbrook, 200,000 Atlantic salmon to Kejimikujik, 387,600 same species to Stevens ponds and 7,500 speckled trout to Middleton. A distribution of 20,000 Atlantic salmon was made into the Nictaux River and 5,000 speckled trout into Walker Brook.

#### YARMOUTH HATCHERY

*F. F. Annis, Superintendent*

The hatchery ponds November 24 to December 16 produced 120,000 speckled trout eggs. Additional eggs received were—in February and March 2,000,000 speckled trout from Antigonish, 100,000 same species from Saint John, 500,000 Atlantic salmon from Margaree and in November 1,002,000 speckled trout from Saint John hatchery. Distributions from Yarmouth amounted to 250,700 Atlantic salmon and 1,135,000 speckled trout. One hundred Atlantic salmon fingerlings and 112 speckled trout fingerlings, and one and two year old fish were displayed at the Yarmouth Exhibition on August 4. Ten bottoms 60 feet in length were laid in longitudinal ponds 3—19 and 23—25. A mink proof fence was built around one of the circular ponds and the grounds improved generally. Good angling was reported from Butler Lake. The Digby and Shelburne Counties' Fish and Game Associations were particularly helpful in making distributions and giving information. Messrs. S. Ring and L. Comeau rendered valuable assistance and the fishery inspectors willingly co-operated when called upon.

#### CHARLO HATCHERY

*R. O. Barrett, Superintendent*

Stripping operations at the hatchery ponds October 19 to 31 yielded 205,400 speckled trout eggs, and at the Restigouche River October 21 to 25 where facilities for this work were extended by the courtesy of the Restigouche Riparian Association 1,195,800 Atlantic salmon eggs. These collections were supplemented by receipt of 1,002,800 Atlantic salmon eggs in October and November from New Mills salmon pond, and 40,000 speckled trout fingerlings June 25 from Florenceville hatchery. Distributions for the season were 1,663,700 Atlantic salmon and 31,200 speckled trout, 5,573 of which were marked and distributed into Island Lake. In selective breeding 20 pairs of speckled trout 2 years old yielded 2,048 eggs per female as

against 1,592 per female in the general group of the same age. The Dalhousie Branch of the Fish and Game Association assisted during the distribution of fish in their district. A drip incubator containing 156,940 Atlantic salmon eggs was placed in operation.

#### FLORENCEVILLE HATCHERY

*J. M. Butler, Superintendent*

The hatchery ponds October 15 to December 12 produced 1,773,900 speckled trout eggs and Clinch Brook November 12 to 22 yielded 69,700 sebago salmon eggs. Receipt of eggs from other sources were—in February and March 500,000 speckled trout from Saint John and 100,000 same species from Antigonish, and in November 520,000 Atlantic salmon from Miramichi salmon pond. In June 40,000 speckled trout fingerlings were sent to Charlo hatchery. Distributions for the year were 1,764,900 speckled trout, 395,000 Atlantic salmon and 13,600 sebago salmon. All sebagos were marked by fin clipping before being liberated, 6,500 into Clinch Brook and 7,100 into Skiff Lake. Recaptures of marked fish were 34 sebago salmon from Clinch Brook, and one speckled trout from Brown Lake. In selective breeding 10 pairs of 5 and 6 year old speckled trout yielded 1,891 eggs per female as against 1,200 in the general group of the same age. A combined coldstorage, feedroom and workshop was completed except for a few minor details. Repairs were made to the concrete work of the long ponds and storage dam, seven pond shades constructed, minor repairs made to buildings and equipment and grounds improved generally. Knoxford Lake which was barren before being stocked with yearlings in 1946 has produced the best speckled trout in the County. Nashwaakis and Penniac streams are reported as improving steadily. Members of the Fredericton and Woodstock Fish and Game Associations, Mr. C. H. Kilpatrick, Unit Officer, and many wardens and guides assisted in selecting the best distributing grounds and helped in planting fish. At Clinch Brook, Mr. H. Sloan, Provincial Fish and Game Warden, assisted during the collection, particularly in keeping the brook clear of beaver dams during the sebago migration.

#### GRAND FALLS HATCHERY

*W. A. McCluskey, Superintendent*

In February and March the following numbers of eggs were received—2,000,000 speckled trout from Saint John, 100,000 same species from Antigonish and 900,000 Atlantic salmon from Miramichi; in November 1,535,600 Atlantic salmon from Miramichi salmon pond and 1,112,400 speckled trout from Saint John hatchery. Distributions for the season were 1,331,500 Atlantic salmon and 1,313,000 speckled trout. A combined double garage, icehouse and cold storage was completed except for minor details. A new cement floor was laid in the hatchery, a new floor in the fuel room, two new four-inch stand-pipes with new valves placed in hatchery, and three of the foundation walls renewed. Hydro power was installed in the buildings. Co-operation in making distributions was received from the Madawaska and Grand Falls Fish and Game Protective Associations.

#### MIRAMICHI HATCHERY AND SALMON-RETAINING POND

*Frank Burgess, Superintendent*

In October and November 6,870,500 Atlantic salmon eggs were received from the Miramichi salmon pond. Outgoing shipments of eyed eggs of the same species in March were 100,000 to Glenora hatchery, Department of Lands and Forests, Fish and Wildlife Division, Ontario, 1,000 to Dr. K. C. Fisher, University of Toronto, and 900,000 to Grand Falls hatchery, N.B. Distributions for the season amounted to 2,685,500 Atlantic salmon. Larger numbers of this species were reported on the spawning grounds this year than last. Drift net and commercial fishing were fair and fly fishing was good the first part of the season. More low land on the hatchery property was filled in, seeded down and improved.

The parent salmon for the Miramichi pond were purchased as usual by tender and contract, and from September 11 to 29, one thousand nine hundred and thirteen



fish averaging 8.2 pounds in weight were impounded. Between October 22 and November 15, one thousand two hundred and sixty-nine females were stripped yielding 9,028,100 eggs which were allotted, 6,870,500 to Miramichi, 1,535,600 to Grand Falls, 520,000 to Florenceville and 102,000 by plane to the State of New York Conservation Department, Albany, New York.

#### NEW MILLS SALMON-RETAINING POND

*William White, Superintendent*

Between June 7 and July 10, two hundred and thirty-four salmon averaging  $14\frac{1}{2}$  pounds were purchased from ten commercial fishing stands of the district, delivered and impounded at the New Mills pond. Towing of the fish from the nets to the pond was done by contract on a daily rate basis. At spawning time October 23 to November 7, one hundred and thirty-two females yielded 1,002,800 eggs which were all laid down for incubation in the Charlo hatchery. Only four salmon were lost during their retention period in the pond from June to November. This year instead of paying the fishermen a rate per fish they were purchased by the pound and commercial prices paid plus a handling charge per fish. The new system worked very satisfactorily and larger-than-usual salmon were secured for the pond.

#### SAINT JOHN HATCHERY

*K. G. Shillington, Superintendent*

The hatchery ponds in November and December produced 9,272,000 speckled trout eggs which were allotted, 1,005,200 to Middleton, 1,112,400 to Grand Falls, 1,002,000 to Yarmouth, 206,000 to Antigonish and the balance 5,946,400 was laid down for incubation in the Saint John hatchery. The ponds also produced 33,400 rainbow trout eggs in April and May. Besides the collections from the ponds, the following eggs were received 500,300 Atlantic salmon from Cobequid in March and 100,000 speckled trout from Antigonish in November. Outgoing shipments of speckled trout eyed eggs in February and March were 500,000 to Florenceville, 2,000,000 to Grand Falls, 300,000 to Baldwins Mills hatchery, Quebec and 100,000 each to Yarmouth and Middleton hatcheries. The distributions for the season were 435,200 Atlantic salmon, 12,000 sebago salmon, 3,222,100 speckled trout and 16,000 rainbow trout. Nine thousand and eighty-nine of the sebago salmon, one and two years old, 25,895 speckled trout fingerlings and yearlings, and 1,706 Atlantic salmon, one and two years old, were marked by fin clipping before being planted—all marked seabagos and Atlantic salmon in Chamcook Lake, and speckled trout as follows: 770 one year and 7,700 fingerlings to Gibson Lake, 675 one year and 6,750 fingerlings to Crecy Lake and 10,000 fingerlings to Round Lake. In selective breeding 11 pairs of speckled trout two years old yielded 2,204 eggs per female as against 1,268 per female in the general group of the same age and 16 pairs three years old yielded 2,528 eggs per female in the selective group as against 2,095 in the general group. The Moncton, Sussex, Minto, Fredericton Junction, McAdam, St. Steven, and Saint John Fish and Game Associations co-operated in making the distributions. Special mention is given to the Saint John branch which called for the fish at the hatchery and made delivery to most of the waters in the Saint John district. The following speckled trout were supplied the Fisheries Research Board, 2,006 one year old for Kelly's supply pond, 770 one year and 7,700 number three fingerlings for Gibson Lake, and 675 one year and 6,750 number three fingerlings for Crecy Lake. Fish of various species and ages were exhibited: 1,423 at Folly Lake and 127 at Lunenburg Exhibitions held June 21 and September 16-20 respectively. In the spring large numbers of speckled trout were caught in Loch Lomond. Rainbow trout have been established in Big Salmon River and Dicks Lake and satisfactory reports have been received from other waters stocked. Five of the hatchery long ponds were repaired, a new icehouse constructed and the old feedroom converted for cold storage. The former icehouse was changed for new larger

feedroom. A drain was excavated from the chlorination plant and 300 feet of concrete 8-inch tile drain laid. Repairs were made to the roof of the hatchery which had been damaged by fire. Due to abnormally low water no sebago salmon eggs were taken at Chamcook Lakes this year.

#### CARDIGAN REARING PONDS

*Clarence Sayer, Superintendent*

Between May 13 and 31, Kelly's pond hatchery supplied 656,200 speckled trout and 50,000 Atlantic salmon advanced fry from which 514,500 trout and 46,100 salmon fingerlings were later distributed. From the Sault Ste. Marie hatchery, Ontario, 5,000 rainbow trout eggs were received in July. From these, 1,100 fingerlings were later planted. The Fisheries Research Board were assisted in their work and trout from Ellerslie and West Rivers were secured, retained in the ponds and stripped October 29 to December 1 yielding 46,900 eggs which were transferred to Kelly's pond hatchery. Angling in local streams was good and the numbers of fish on the spawning grounds compared favourably with the previous year. Four ponds were repaired and new under-drains laid.

#### KELLY'S POND HATCHERY AND MORELL RIVER SALMON-RETAINING POND

*C. A. Tait, Superintendent*

A collection of 627,000 speckled trout eggs was made from the hatchery supply pond October 28 to December 2. Other eggs received were, 1,000,000 speckled trout from Antigonish hatchery in March and 693,300 Atlantic salmon from Morell pond in November. Two thousand and six speckled trout yearlings were received from Saint John hatchery in July. Forty-six thousand nine hundred speckled trout eggs taken for the Research Board were received from Cardigan ponds. Outgoing shipments were—in March 700,000 Atlantic salmon eggs to Antigonish, and in May 656,200 speckled trout eggs and 50,000 Atlantic salmon advanced fry to Cardigan rearing station. Distributions for the season were, 457,400 Atlantic salmon and 422,600 speckled trout. Repairs to the wastegate from the supply pond were completed, the garage enlarged, the hatchery roof reshingled and windows in this roof enlarged to give more light for office and workroom. Angling for speckled trout was reported very good, especially in sea trout. The number of salmon on the spawning grounds compared favourably with last year. Assistance was given the Fisheries Research Board in connection with construction work at Simpson's Pond dam.

Assistant R. E. H. MacDonald was in charge of the salmon retaining pond at the Morell River where 206 salmon averaging eight pounds in weight were impounded between October 15 and November 11. From 96 females stripped November 12 to 22, a yield of 693,300 eggs was secured for Kelly's pond hatchery. A severe storm on October 23 caused an unusually high tide flooding the living quarters, covering the fence and trap with about 2 feet of water and causing the escape of 33 salmon from the retainer.

#### *Receipts and Shipments Generally*

Receipt of eggs from the New York Conservation Department consisted of 294,200 brown and 103,900 Rainbow trout for Middleton hatchery, N.S.; and from the Sault Ste. Marie hatchery, Fish and Wildlife Division, Department of Lands and Forests, Ontario, 5,000 rainbow trout eggs for Cardigan rearing station. Outgoing shipments were—from Miramichi salmon pond 102,000 Atlantic salmon to New York Conservation Department and from Miramichi hatchery 100,000 same species to Ontario provincial hatchery at Glenora; and from Saint John hatchery 300,000 speckled trout eggs to Quebec provincial hatchery at Baldwins Mills.

## STATEMENT BY SPECIES OF LOCAL COLLECTION AND DISPOSAL OF EGGS DURING 1947

Species	Collection Area	Eggs collected	Number collected	Disposal—Establishment at	Eggs received	Number	Totals
Atlantic salmon.	Margaree pond, N.S.	Nov. 13-Dec. 4.	5,029,300	Lindloff	Nov. 25.	1,249,300	
	River Philip, N.S.	Nov. 10-25	3,675,620	Margaree	Nov. 21-Dec. 5.	3,780,000	
	Sackville River, N.S.	Nov. 6-Nov. 14.	175,000	Bedford	Nov. 22	768,040	
	Miramichi pond, N.B.	Oct. 22-Nov. 15.	9,028,090	Cobequid	Nov. 10-26	2,907,580	
				Bedford	Nov. 6-14.	175,000	
				Florenceville	Nov. 11.	520,000	
				Grand Falls	Nov. 5, 8.	1,535,600	
				Miramichi	Oct. 23-Nov. 16.	6,870,490	
				State of New York			
				Conservation Dept.			
Rainbow trout.	New Mills pond, N.B.	Oct. 23-Nov. 7.	1,002,830	Charlo	Nov. 4.	102,000	
	Restigouche River, N.B.	Oct. 21-25.	1,198,500	Charlo	Oct. 23-Nov. 7.	1,002,830	
	Morell River, P.E.I.	Nov. 12-22.	693,300	Kelly's pond	Oct. 22, 25.	1,195,800	
	Saint John hatchery ponds, N.B.	Nov. 12-22.	33,000	Saint John	Nov. 12-22.	693,300	
	Grand Lake, N.S.	Apr. 17-May 10.	13,020	Grand Lake	Apr. 17-May 10.	33,400	20,799,940
	Grand Lake rearing ponds, N.S.	Nov. 15-26.	84,750	Grand Lake	Nov. 15-26.	13,020	
	Clinch Brook, York County, N.B.	Nov. 8-22.	69,660	Grand Lake	Nov. 8-22.	84,750	
	Antigonish hatchery ponds, N.S.	Nov. 1-28.	9,510,300	Florenceville	Nov. 12-22.	69,660	187,430
		Nov. 14-27.	(a) 2,970,500	Antigonish	Nov. 1-28.	12,388,800	
			(a) 1,517,590	Saint John	Nov. 11.	100,000	
Speckled trout.	Cobequid hatchery ponds, N.S.	Oct. 20-Nov. 28.	1,000,440	Cobequid	Oct. 30-Nov. 28.	2,518,030	
	Lindloff hatchery ponds, N.S.	Nov. 8-28.	338,410	Lindloff	Nov. 8-Dec. 9.	338,410	
	McRae Lake, Richmond County, N.S.	Oct. 11-20.	48,390	Lindloff	Oct. 11-20.	48,390	
	Margaree hatchery ponds, N.S.	Oct. 24-Nov. 29.	1,057,125				
	Yarmouth hatchery ponds, N.S.	Oct. 31-Nov. 29.	286,655	Margaree	Oct. 24-Nov. 29.	1,343,780	
		Nov. 24-28.	33,560				
		Dec. 2-16.	(a) 86,500	Yarmouth	Nov. 24-Dec. 16.	120,060	
	Charlo hatchery ponds, N.B.	Oct. 19-31.	205,440	Charlo	Oct. 19-31.	205,440	
	Florenceville hatchery ponds, N.B.	Oct. 15-Dec. 12.	1,773,850	Florenceville	Oct. 15-Dec. 12.	1,773,850	
	Saint John hatchery ponds, N.B.	Nov. 3-26.	6,787,690	Antigonish	Nov. 12.	206,000	
Speckled trout.		Nov. 20-Dec. 1.	(a) 2,484,300	Middleton	Nov. 12.	1,005,200	
				Yarmouth	Nov. 21.	1,002,000	
				Grand Falls	Nov. 12-Dec. 2.	1,112,400	
				Saint John	Nov. 3-Dec. 1.	5,946,390	
				Kelly's pond	Oct. 29-Dec. 1.	46,910	
	Ellerslie and West Rivers, P.E.I.	Oct. 29-Dec. 1.	46,910	Kelly's pond	Oct. 28-Dec. 2.	627,000	28,782,660
	Kelly's pond hatchery pond, P.E.I.	Oct. 28-Dec. 2.	627,000				49,783,430

(a) from yearling fish.



## TRANSFERS MADE IN 1947

Species	From	To	Eyed Eggs		Fry		Fingerlings	
			Number	Date received	Number	Date received	Number	Date received
Atlantic salmon.....	Bedford.....	Grand Lake.....	.....	.....	110,000	June 11, 14.	150,000	June 17, 18
	Bedford.....	Mersey.....	.....	.....	150,000	June 6, 13.	50,000	June 16
	Cobequid.....	Saint John.....	500,280	Mar. 25	.....	.....	.....	.....
	Margaree.....	Lindlof.....	600,000	Mar. 31	.....	.....	.....	.....
	Margaree.....	Nictaux.....	700,000	Apr. 5	.....	.....	.....	.....
	Margaree.....	Yarmouth.....	500,000	Mar. 29	.....	.....	.....	.....
	Nictaux.....	Kejimikujik.....	.....	.....	.....	.....	200,000	June 11-14
	Nictaux.....	Middleton.....	.....	.....	.....	.....	378,600	June 19
	Miramichi.....	Grand Falls.....	900,000	Mar. 14	.....	.....	.....	.....
	Kelly's Pond.....	Antigonish.....	700,000	Mar. 14	50,000	May 31	.....	.....
Brown trout.....	Kelly's Pond.....	Cardigan.....	.....	.....	172,500	Apr. 1.	.....	.....
	Middleton.....	Nictaux.....	.....	.....	.....	.....	125,500	May 23, 24
Speckled trout.....	Nictaux.....	Coldbrook.....	2,000,000	Feb. 26	.....	.....	.....	.....
	Antigonish.....	Bedford.....	2,000,000	Mar. 13	.....	.....	40,000	Oct. 2-Dec. 8
	Antigonish.....	Cobequid.....	.....	.....	.....	.....	.....	.....
	Antigonish.....	Grand Lake.....	2,000,000	Mar. 6	.....	.....	.....	.....
	Antigonish.....	Middleton.....	2,000,000	Mar. 20	.....	.....	.....	.....
	Antigonish.....	Yarmouth.....	100,000	Mar. 22	.....	.....	.....	.....
	Antigonish.....	Florenceville.....	100,000	Mar. 22	.....	.....	.....	.....
	Antigonish.....	Grand Falls.....	1,000,000	Mar. 15	.....	.....	.....	.....
	Antigonish.....	Kelly's Pond.....	.....	.....	180,000	May 21-23.	120,000	May 28-30
	Bedford.....	Coldbrook.....	.....	.....	.....	.....	100,000	May 29, 31
	Bedford.....	Mersey.....	.....	.....	511,100	Mar. 31	400,000	May 10-20
	Middleton.....	Nictaux.....	.....	.....	.....	.....	7,500	June 19
	Nictaux.....	Kejimikujik.....	.....	.....	.....	.....	40,000	June 25
	Nictaux.....	Middleton.....	.....	.....	.....	.....	.....	.....
	Florenceville.....	Charlo.....	.....	.....	.....	.....	.....	.....
	Saint John.....	Middleton.....	100,000	Feb. 27	.....	.....	.....	.....
	Saint John.....	Yarmouth.....	100,000	Feb. 27	.....	.....	.....	.....
	Saint John.....	Florenceville.....	500,000	Feb. 27	.....	.....	.....	.....
	Saint John.....	Grand Falls.....	2,000,000	Feb. 27	.....	.....	.....	.....
	Kelly's.....	Cardigan.....	.....	.....	441,000	May 22-24.	215,200	May 13-14





## DISTRIBUTIONS

## KEY TO ABBREVIATIONS

*Species*

- A. Atlantic salmon.
- B. Brown trout.
- R. Rainbow trout.
- L. Landlocked or Sebago salmon.
- S. Speckled trout.

*Stages of Development.*

- a. Green eggs.
- b. Eyed eggs.

- c. Fry.
- d. Advanced fry.
- 1. No. 1 fingerlings.
- 2. No. 2 fingerlings.
- 3. No. 3 fingerlings.
- 4. No. 4 fingerlings.
- 5. No. 5 fingerlings.
- f. Yearlings.
- g. Two years.
- h. Three years.
- k. Older fish.

## CLASSIFICATION

Advanced fry: Fish for a period of two weeks following complete absorption of the yolk sac.

## Fingerlings:

- No. 1 From two to eight weeks after complete absorption of the yolk sac.
- No. 2 From eight to fourteen weeks after complete absorption of the yolk sac.
- No. 3 From fourteen to twenty weeks after complete absorption of the yolk sac.
- No. 4 From twenty to twenty-six weeks after complete absorption of the yolk sac.
- No. 5 From twenty-six weeks to one year from date of hatch.

## NOVA SCOTIA

## ANTIGONISH HATCHERY

*Antigonish County—*

Afton River—30,000 Sd, 15,000 S1, 2,500 S4  
 Beaver Meadow River—40,000 Sd, 25,000 S1,  
 15,000 S3, 5,000 S4, 1,840 S5.  
 Big Brook—South River—30,000 Sd, 40,000  
 S1, 1,500 S4.  
 Black River—40,000 Sd, 20,000 S1, 15,000 S3.  
 Brierly Brook—20,000 Sd, 20,000 S1.  
 Cameron Lake—West River—35,000 S1.  
 Delhanty Lake—40,000 S1.  
 Gaspereaux Lake—40,000 S1, 5,000 S3, 1,400  
 Sf.  
 Glenroy River—55,000 S1, 15,000 S2, 2,500  
 S4.  
 James River—20,000 A1, 40,000 A2.  
 Linwood Lake—30,000 S1, 1,252 Sh.  
 MacDonald Lake—35,000 S1.  
 MacGillivray Lake—South River—420 Sh.  
 Maryvale or Malignant Brook—40,000 S1.  
 McMillan Lake—20,000 S1, 125 Sh.  
 Meadow Green River—50,000 Sd, 30,000 S1,  
 10,000 S3, 2,500 S4.  
 Middleton Lake—45,000 S1.  
 North Lake—50,000 S1.  
 North River—10,000 S2.  
 Pinevale Lake—10,000 S1.  
 Pinevale Brook—15,000 Sd.  
 Polson Brook—South River—15,000 Sd,  
 40,000 S1, 2,000 S4.  
 Rights River—30,000 A1.  
 St. Joseph Lake—30,000 S1, 5,000 S2, 10,000  
 S3, 5,000 S4, 1,200 Sf.  
 South Lake—50,000 S1.  
 South River—20,000 A1, 40,000 A2, 50,000  
 Sd, 150,000 S1, 1,500 S4, 2,000 S5, 800 Sf.  
 Springfield Brook—Glenroy River—25,000  
 S1, 5,000 S2, 2,500 S4.  
 West River—50,000 Sd, 85,000 S1, 15,000 S2,  
 5,000 S3, 15,000 S4, 2,500 S5, 1,200 Sf.

*Guysborough County—*

Beaver Dam Lake—Salmon River—15,000  
 S3.  
 Black Lake—25,000 S2.  
 Canter Lake—40,000 S1, 5,000 S2.  
 Cooe Coe Lake—30,000 S1, 10,000 S3,  
 15,000 S4.  
 Country Harbour River—40,000 A1.  
 Cudahys Lake—25,000 S1, 15,000 S2.  
 Desbarres Lake—15,000 S2.  
 Dobson Lake—70,000 S1, 50,000 S2.  
 Donahue Lake—120,000 S1, 15,000 S2.  
 Dunphy Lake—10,000 S3.  
 Ecumsecum River—50,000 S1, 10,000 S3.  
 Eight Island Lake—60,000 S1. Fitzgerald  
 Lake—40,000 S2.  
 Giant Lake—50,000 Sd, 50,000 S1, 20,000 S2,  
 10,000 S3, 2,500 S4.  
 Glencove Lake—10,000 S3.  
 Goldboro or Goldbrook Lake—25,000 S2.  
 Goose Harbour Lake—15,000 S3.  
 Goshen Lake—30,000 S1.  
 Guysborough River—50,000 S1.  
 Hazel Hill Lake—50,000 S1, 15,000 S3.  
 Hydro Dam, Havre Bouche River—65,000  
 S1.  
 Indian Harbour Lake—40,000 S2, 15,000 S3.  
 Jellow Lake—110,000 S1, 10,000 S2, 10,000  
 S3.  
 Kennedy Lake—30,000 Sd, 10,000 S2, 1,000  
 S4.  
 Lawlor Lake—10,000 S3, 5,000 S4.  
 Long Lake—Salmon River—15,000 S1,  
 10,000 S3.  
 Mannassette Lake—50,000 S1, 10,000 S2.  
 Mason Lake—10,000 S3.  
 McInnis (Joe's) Lake—30,000 Sd, 10,000 S2,  
 2,000 S4.

McPherson Lake (Port Shoreham)—50,000 S1, 10,000 S2.

Morrison Lake—60,000 S1.

Narrow Lake—50,000 S1, 2,500 S4.

Nelson Lake—10,000 S3.

Porter River—30,000 Sd, 25,000 S1.

Pringle Lake—25,000 S1, 316 Sh, 174 Sk.

East River St. Mary—130,000 A1.

West River St. Mary—130,000 A1.

Salmon River—30,000 A1, 40,000 Sd, 25,000 S1.

Seal Harbour Lake—25,000 S2, 15,000 S3.

Shepherd Lake—20,000 S2.

Sherbrook Lake—50,000 S1, 20,000 S2, 5,000 S4.

Snows Lake—10,000 S3.

Sullivan Lake—45,000 Sd, 10,000 S2, 2,000 S4.

Taylor Lake—East River St. Mary—30,000 S1.

Three Mile Lake—50,000 S1, 15,000 S3.

Tracadie River—25,000 A2.

Two-Mile Lake—East River St. Mary—30,000 S1, 10,000 S2, 5,000 S4, 1,200 S1.

#### Halifax County—

Round Pond (Smith Settlement)—500 Sf.

#### Pictou County—

Barney River—40,000 A1, 40,000 S1.

Brora Lake—40,000 S2.

Calder Lake—35,000 S2.

Campbell Lake—French River—20,000 S2.

East River—50,000 A1, 100,000 S1, 5,000 S4.

French River Branch (French River Settlement)—30,000 S1.

French River—32,500 A2.

Lansdowne Lake—15,000 S3.

McLellan Brook—50,000 S1.

McPherson Lake—20,000 S2.

Middle River—20,000 A1.

Sixmile Brook—10,000 S1.

Sutherland River—40,000 S1.

West Branch Brook—East River—10,000 S3, 5,000 S4.

West River—90,000 S1, 5,000 S4.

#### BEDFORD HATCHERY

##### Colchester County—

Carter Brook—Stewiacke River—30,000 S1.

##### Halifax County—

Ingram River—17,000 A2.

Little Salmon River—Cole Harbour—17,000 A2.

Musquodoboit River—18,180 A2.

Ninemile River—17,000 A2.

Sheldrake Lake—20,000 S1.

##### Hants County—

Cameron Lake—30,000 S1.

Coxcomb or Cockscomb Lake—30,000 S1.

##### Lunenburg County—

Gold River—17,000 S2.

Middle River—17,000 A2.

#### COBEQUID HATCHERY

##### Albert County—

Pollett River—117,500 A2.

##### Colchester County—

Chiganois River—4,500 S5.

East River, at Five Islands—3,000 S4.

Economy Lake—3,500 S4.

French River—30,000 S1, 4,500 S5.

Little River—Stewiacke River—8,000 S3, 545 Sf.

Newton Lake—3,500 S4.

Shatter Lake—500 Sf.

Silica Lake or Bass River Lake—6,000 S1, 500 Sf.

Simpson Lake—25,000 Sd, 1,296 Sf.

Snare Lake—1,500 S4.

Waugh's River—15,000 S1, 4,500 S5.

Whirley Wha Lake—2,750 S4.

##### Cumberland County—

Amherst Pond (Reservoir)—Nappan River—6,000 S1, 7,000 S3.

Atkinson Brook—River Herbert—3,500 S3.

Barbour Lake—3,500 S1.

Beaver Brook—LaPlanche River—3,000 S3.

Biswanger Brook—River Philip—4,500 S3.

Black Lake—12,500 A3.

Brownell Brook—Shinimikas River—10,500 S1.

Coulter Lake, Upper,—1,500 S3.

Dead Lake—1,500 S4.

Dewar Lake—738 Sg.

East Brook—Maccan River—2,500 S4.

Fountain Lake—10,500 S1.

Gilbert Lake—8,000 Sd, 600 Sf.

Isaac Lake—12,000 Sd.

Leak Lake—7,000 S1, 500 Sf.

Little Lake—Newfound Lake—4,500 Sd.

Maccan River—30,000 Sd, 4,000 S4.

Maccan River, West Branch—21,000 S1.

McAloney Lake—12,000 Sd, 600 Sf.

McLellan Brook—LaPlanche River—4,500 S3, 500 Sf.

McLeod Lake—5,000 Sd, 600 Sf.

Mountain Brook—5,000 Sd.

Newfound Lake—12,000 Sd.

Parrsboro Aboiteau—12,000 S1, 500 Sf.

Poison Lake—3,000 Sd.

Pugwash River—18,000 Sd.

Ramshead Lake—3,000 S4.

River Philip, East Branch—3,000 A3, 1,500 S5, 100 Sf.

River Philip, West Branch—25,000 Sd.

Shinimikas River—30,000 Sd.

Shulie River—3,000 S3.  
 Sugarloaf Brook—2,500 S4.  
 Tillies Brook—18,000 Sd.  
 Two Rivers—3,000 S3.  
 Vickery Lake—6,000 Sd, 450 Sf.  
 Wallace River—30,000 Sd, 18,000 S1.  
 Wallace River, West Branch—30,000 Sd.  
 Webb Lake—Pugwash River—5,000 Sd.

*Westmorland County—*

Bulmer Pond—4,000 S2.  
 Calhoun Brook—Silver Lake or Morice Pond—6,000 S1.  
 Carter Brook—Westcock Creek—3,000 S3.  
 Jenks Brook—Tantramar River—6,000 S1.  
 North Brook—Musquash Lake—250 Sf.  
 Robinson Brook—Tantramar River—16,000 S1, 250 Sf.

COLDBROOK PONDS

*Kings County—*

Annapolis River—10,000 S3, 5,000 S4.  
 Armstrong Lake—10,000 S3.  
 Aylesford Lake—10,000 S3.  
 Brandywind Brook—Cornwallis River—18,000 B3, 9,107 B4.  
 Burke Lake—5,000 S3.  
 Cambridge Brook—Cornwallis River—17,000 B3, 9,000 B4.  
 Canard River—5,000 S3.  
 Cornwallis River—30,000 B4.  
 Crooked Lake—5,000 S3.  
 Crosby Brook—Cornwallis River—15,000 B4.

Gaspereau Lake—10,000 S4.  
 Habitant River—3,000 S3.  
 Lake George—10,000 S3, 5,000 S4.  
 Lake Paul—10,000 S3, 5,000 S4.  
 Lake Torment—10,000 S3.  
 Mack Lake—5,000 S3.  
 Murphy Lake—10,000 S3.  
 North River—9,000 S3.  
 Silver Lake—3,000 S3.  
 Trout River—5,000 S3.  
 Tupper Brook—Cornwallis River—5,000 B4.  
 Upper Sixty Lake—5,000 S3.

GRAND LAKE PONDS

*Colchester County—*

Barren Lake—Stewiacke River—500 Sf.  
 Northwest Lake—Stewiacke River—1,000 Sf.  
 Stewiacke River—20,000 A3.

*Halifax County—*

"A" Lake—1,100 Sf.  
 Albro Lake—1,000 Sf.  
 Anderson Lake—2,000 Sf.  
 Beaverbank River—200 Af.  
 Bell Lake—Chezzetcook Inlet—500 Sf.  
 Chezzetcook River—20,000 A3.  
 Cole Harbour Lake—500 Sf.  
 Conrod Lake—Chezzetcook River—2,000 Sf.  
 Five Island Lake—Hosier River—3,000 Sf.  
 Goose Lake—Porter Lake—1,000 Sf.  
 Kelly Lake—Grand Lake—1,000 Sf.  
 Kieley Lake—1,000 Sf.  
 Lake Major—Little Salmon River—2,000 Sf.  
 Lewis Lake—Ragged Lake—1,000 Sf.  
 Long Lake—Hosier River—1,000 Sf.  
 McGrath Lake—3,000 Sf.  
 Otter Lake—Big Indian Lake—2,000 Sf.

Pockwock Lake—1,000 Sf.  
 Ragged Lake—Prospect Run—2,000 Sf.  
 Rawdon River—20,000 A3.  
 Sackville River—32,000 A3, 4,347 Af.  
 Salmon River—Echo Lake—20,000 A3.  
 Salmon River (Port Dufferin)—20,000 A3.  
 Second Lake—Ship Harbour—2,000 Sf.  
 Second Pratt Lake—Musquodoboit River—1,000 Sf.  
 Shechan Lake—2,000 Sf.  
 Sheldrake Lake—1,000 Sf.  
 Ship Harbour River—20,000 A3.  
 Shubenacadie (Grand) Lake—36,173 Lf, 400 Lg, 620 Lh, 89 Lk.  
 Spider Lake—1,000 Sf.  
 Tangier River—20,000 A3.  
 Tittle Lake—2,000 Sf.  
 Upper Petpeswick, Long Bridge or Bridge End Lake—3,000 Sf.  
 West River Sheet Harbour—20,000 A3.

*Hants County—*

Kennetcook River—20,000 A3.  
 Lewis Lake—1,000 Sf.

KEJIMKUIK PONDS

Hollahan Lake—2,058 S5.  
 Lahave River and tributaries—45,710 A4.  
 Hirtle Lake—9,750 S2.  
 Park Pond—186 S5.  
 Seamore Lake—2,250 S2.  
 Wiles Lake—1,500 S2.  
 Medway River and tributaries—124,300 A4.  
 Annis Lake—3,750 S2.  
 At Delongs Settlement—10,125 S2.  
 Cameron Lake—4,500 S2.  
 Charlotte Lake—500 S5.

First Christopher Lake—7,500 S2.  
 Christopher Brook—1,500 S2.  
 Collins Lake—1,250 S5.  
 Freeman Lake—1,125 S2.  
 Harmony Lake—7,875 S2.  
 Malaga or Maligeak Lake—16,500 S2.  
 McGowan Lake—10,125 S2.  
 Pleasant River—6,750 S2.  
 Pretty Mary Lake—750 S5.  
 Scott Lake—3,000 S2.  
 Tupper Lake—6,750 S2.  
 Whiteburn Brook—4,500 S2.  
 Wild Cat River—6,750 S2.



Mersey River—13,500 S2.  
 Beaverhead Lake—500 S5.  
 Cannon Lake—6,000 S2.  
 Grafton Lake—6,750 S2, 1,240 S5.  
 Grafton Brook—495 S5.  
 Kejimikujik Lake—6,750 S2, 1,245 S5.  
 Little River—13,500 S2.  
 Minard Lake—4,500 S2.  
 Mount Tom Brook—7,500 S2.  
 Red Lake—500 S5.  
 Rodger Brook—6,000 S2.

Upper Mersey River—13,500 S2, 1,240 S5.  
 Westward or West River—13,500 S2.

Petite River  
 Crouse Lake—372 S5.  
 Fancy Lake—6,750 S2.  
 Garber Lake—2,250 S2.  
 Hebb Lake—6,750 S2.  
 Lewie Lake—3,000 S2.  
 Minamkeak Lake—8,250 S2.  
 Newcombe Lake—372 S5.  
 Oakhill Lake—930 S5.

## LINDLOFF HATCHERY

*Cape Breton County—*

Blackett Lake—25,000 S1, 10,000 S2.  
 Canoe Lake—30,000 S2.  
 Catalogne Lake—30,000 S1, 8,000 S2.  
 Chain or String Lakes—Mira River—20,000 S1.  
 Cochran Lake—25,000 S1.  
 Dutch Brook Lake—20,000 S1, 5,000 S2.  
 Gabarus Lake—20,000 S1.  
 Gaspereaux River—60,000 A1.  
 Gillies Lake—East Bay—35,000 S1.  
 Grand Lake, near Louisburg—20,000 S1, 8,000 S3.  
 Hardy Lake—20,000 S1.  
 Loon Lake—Mira Bay—20,000 S1.  
 McCormick Lake—24,000 S1, 8,000 S3.  
 Meadow Brook—Sydney River—50,000 S1.  
 Pottle Lake—20,000 S2, 10,000 S3.  
 Salmon River—130,000 A1.  
 Stewart Lake—20,000 S1, 3,400 S2, 4,600 S3.

*Inverness County—*

Brawley Lake—15,000 S1.  
 Horton Lake—25,000 S1.  
 McIntyre Lake (Grantville)—20,000 S1.  
 McPhail Lake—15,000 S2.  
 Pleasant Hill Lake—15,000 S1.

*Richmond County—*

Barren Hill Lake—30,000 S2.  
 Black River—50,000 S1.  
 Breen Lake—25,000 S1.  
 Buchanan Lake—30,000 S1.  
 Cameron Lake—20,060 S1.  
 Falls Bay Brook—5,000 S1.

Ferguson Brook—8,000 S1.  
 Ferguson Lake—40,000 S1.  
 Framboise River—60,000 A1.  
 Grand River—102,450 A1.  
 Indian Lake—15,000 S1.  
 Kytes Lake—20,000 S1.  
 Lindloff or Hatchery Lake—30,000 S1, 45,000 S2, 735 Sf.  
 Loch Lomond—180,000 A1.  
 MacLeod Brook—20,000 S1.  
 Mary Ann's Lake—6,000 S1, 12,000 S2.  
 McIsaac Lake—30,000 S1.  
 McKenzie Lake—20,000 S1, 5,000 S2.  
 McNab Lake—30,000 S1.  
 Mill Lake—East River Tillard—20,000 S1, 5,000 S2.  
 River Tillard, head of tidewater—700 Sh, 96 Sk.  
 River Tillard, East—20,000 S1.  
 River Tillard, West—30,000 S1.  
 River Tom—25,000 S1.  
 Rockdale Lake—20,000 S1.  
 Saint Esprit Lake—30,000 S1.  
 Sampson Lake—15,000 S2.  
 Scott Brook—15,000 Sd.  
 Straughton Brook—15,000 S1.  
 Thompson Lake—6,000 S1, 12,000 S2.  
 Madame Island—  
 Chain Lake—20,000 S1.  
 Forest Lake—30,000 S1.  
 Grand Lake—44,000 S1, 5,000 S2, 10,000 S3.  
 Noels Lake—20,000 S1, 15,000 S2.  
 Potties Lake—20,000 S1, 8,000 S2.  
 Shaw Lake—20,000 S1, 8,000 S2.

## MARGAREE HATCHERY

*Cape Breton County—*

Black Brook—Mira River—10,000 S1.  
 Ferguson Lake (New Boston)—10,000 S1.  
 Forester Lake—20,000 S1.  
 Giovanetti Lake—15,000 S1.  
 Grand Lake—Indian Bay—15,000 S1.  
 Jackson or Johnson Lake—15,000 S1.  
 Kilkenney Lake—15,000 S2.  
 McDonald or Widow Lake (New Boston)—15,000 S1.  
 McInnes Lake—15,000 S1.  
 McIntyre Lake (New Boston)—15,000 S1.  
 McMillan Lake—15,000 S1.  
 McPherson Lake (New Boston)—15,000 S1.  
 Scotch or Scott Lake—15,000 S1.  
 Trout Brook—Mira River—15,000 S1.

*Inverness County—*

Big Brook—River Denys—30,000 S1.  
 Cheticamp River—100,000 A4.  
 Farm Brook—5,000 S2.  
 Galant River—25,000 S2, 300 Sf.  
 Glen Brook—River Denys—20,000 S4, 250 Sf.  
 Glenora Brook—10,000 S3.  
 Grand Etang Brook—25,000 S2.  
 Margaree River, Northeast and tributaries—630,000 A4.  
 Big Brook—25,000 S1.  
 Coady Ponds—500 S4.  
 Egypt Brook—25,000 S2, 5,000 S5, 500 Sf.  
 Forest Glen Brook—25,000 S1.

Ingram (Ingraham) Brook—25,000 S4,  
300 Sf, 270 Sg.  
Levis Brook—25,000 S1, 5,000 S5, 513 Sf.  
Mancini Pond (Margaree Forks)—200 S4.  
McLeod Brook—10,000 S5.  
Watson Brook—7,000 S2, 5,000 S5, 500 Sf.  
Margaree River, southwest—150,000 A4.  
Captain Allan's Brook—35,000 S1, 5,000  
S5.  
Matheson Glen Brook—25,000 S2.  
McDonnell Brook—15,000 S2.  
McColl Brook—20,000 S5.  
McKenzie Brook—River Denys—20,000 S4.  
McKinnon Pond—3,000 S3.  
McPherson Brook—River Denys—20,000  
S4, 250-Sf.  
Mull River—50,000 A4.  
Plaster Ponds—525 Sk.  
Plateau Brook—40,000 S1.  
Rough Brook—River Inhabitants—30,000 S2  
Skye Brook—30,000 S3, 500 Sf.  
Strathlorne Brook—25,000 S1, 5,000 S5.

#### *Victoria County—*

Aspy River, Middle—30,000 A4.  
Aspy River, North—30,000 A4.

Baddeck River—100,000 A4.  
Farquar Angus or McDonald Brook—  
20,000 S1.  
Gillis Brook—25,000 S1.  
Harris Brook—10,000 S1.  
Peter Brook—40,000 S1, 500 Sf.  
Barasois River—50,000 S1.  
Campbell Brook (Estmere)—15,000 S1.  
Carey Lake—4,000 S1.  
Dalem Lake (Boularderie Island)—20,000  
S1.  
French River Ponds (French River)—5,000  
S5.  
Ingonish River—30,000 A4.  
McDonald Pond (Baddeck)—200 S5.  
McKinnon Harbour Brook—10,000 S1.  
McLean Brook (Ottawa Brook)—5,000 S1.  
McPhee Brook (Southside Boularderie)—  
5,000 S1.  
Middle River—100,000 A4.  
Beaver Brook—20,000 S1.  
Black Brook—25,000 S1, 500 Sf.  
Cold Brook—30,000 S1.  
Indian Brook—40,000 S1, 500 Sf.  
McDonald Brook—30,000 S1.  
Morrison Lake—10,000 S5.  
North River—150,000 A4.  
Tarbot Lake—5,000 S2.  
Smith's Ponds (Briton Cove)—10,000 S5.  
Washabuck River—50,000 S1.

#### MERSEY PONDS

#### *Queens County—*

Louis Lake—10,000 S3.  
Mersey River—182,000 A2.  
No. 3 Headpond Lake—16,000 S3.

Lower Great Brook—15,000 S3.  
Upper Great Brook—10,000 S3.  
Path Lake—15,000 S3.  
Robertson Lake—15,000 S3.

#### MIDDLETON HATCHERY

#### *Annapolis County—*

Annapolis River—25,000 A3.  
Bear River, East Branch—12,000 S3.  
Blanchard Lake—10,000 S3.  
Cranberry Lake—6,000 S3.  
Elliott Lake—12,000 S3.  
Evan Brook—10,000 S3.  
Fed Lake—7,000 S2.  
Fishers Lake—25,000 S2.  
Foster Lake—6,000 S3.  
Grand Lake—10,000 S3.  
Jeny Lake—2,000 S2.  
Katy or Cady Lake—10,000 S2.  
Lake LaRose—5,000 S2.  
Lake Pleasant—25,000 S1.  
Lequille River—20,000 A3.  
Little River—Annapolis River—10,000 S2.  
McGill Lake—25,000 S2.  
Mink Brook—8,000 S2.  
Morton Brook—250 S4.  
Mulgrave Lake—15,000 S3.  
Nictaux River—35,000 A3, 8,000 S4.  
North Lake (Annapolis Basin)—1,000 S4.  
Paradise Lake—25,000 S2.  
Parker Brook—10,000 S2.  
Round Hill River—30,000 A3.  
Sandy (Sand) Lake—10,000 S3, 5,000 S4.  
Sandy Bottom Lake—10,000 S3.  
Shannon Lake—25,000 S1.  
Simpson Lake—Bear River—8,000 S2.  
Sixty Lake—10,000 S3.

Skull Lake, near Princedale—10,000 S3.  
Slocomb Brook—1,860 S1, 860 S2, 4,210 S3.  
Spectacle Lake, Southwest—Medway River  
—7,000 S4.  
Stream between Liverpool Head and Boot  
Lakes—12,000 S3.  
Sundown Lake—Bear River—9,000 S2.  
Ten Mile River—10,000 S2.  
Thirty Lake—17,000 S2.  
Trout Lake—17,000 S2, 5,000 S4.  
Upper Mink Lake—2,500 S4.  
Walker Brook—5,000 S2.  
Waterloo Lake—25,000 S1, 12,000 S3.  
Wiswal (Wiswell) Brook—3,000 S2, 250 S4.  
Zwicker Lake—500 S4.

#### *Digby County—*

Haines Lake—15,000 S2.  
Lake Jolly—22,000 S2, 14,000 S3.  
Mallette Lake—10,000 S2.  
Mistake River—9,000 S2.  
Porter or Mistake Lake—31,000 S2.

#### *Hants County—*

Cameron Lake—3,000 S4.  
Falls Lake Stillwater—10,000 S3.  
Lebreau Brook—7,000 S2.  
Murphy Lake—Avon River—17,000 S2.  
Panuke Lake—15,000 S2.  
Pigot Lake—5,000 S4.  
Zwicker or Daniel Lake—10,000 S2.

*Kings County—*

Gaspereau River—20,000 A3.

*Lunenburg County—*

Ash Brook—Lahave River—13,000 S2.

Bezanson Lake—15,000 S2.

Canoe Lake, North—10,000 S3.

Card Lake—35,000 S2.

Church Lake—10,000 S3.

Crouse Lake—8,000 S2.

Covey Lake—12,000 S3.

Gold River—25,000 A3.

Harris Lake—10,000 S3.

Indian Lake—Gold River—8,000 S2.

Island Lake—Lahave River—6,000 S3.

Lahave River—30,000 A3.

Lake William—23,000 S2.

Lewis Lake—12,000 S2.

Little Mushamush Lake—6,000 S3.

Long Lake—St. Margaret Bay—2,500 S4.

Martin River—12,000 S3, 5,000 S4.

Mill Cove Cranberry Lake—2,000 S4.

Mushamush River—6,000 S3.

New Germany Lake—25,000 S2.

Ninevah Lake—6,000 S2.

Oakland Lake—10,000 S2.

Ohio or West River—5,000 S3.

Pine Lake—Lahave River—6,000 S3.

Second Lake—Deep Cove—2,500 S4.

Smith Brook—Lahave River—6,000 S2.

Wallaback Lake 20,000 S2.

Wentzell Lake, near Lunenburg—7,000 S2.

Wentzell Lake, near New Germany—10,000 S2.

West or Rocky Lake—Ohio River—10,000 S3.

Whetstone Lake—12,000 S3.

## NICTAUX FALLS REARING STATION

*Annapolis County—* Nictaux River—20,000 A1.

Walker Brook—5,000 S1.

## YARMOUTH HATCHERY

*Digby County—*

Abramson Brook—3,000 S1.

Acacia Brook—12,000 S1.

Acadia Branch—6,000 S1.

Belliveau River—6,000 S1.

Bingay Brook—18,000 S1.

Budd Brook—12,000 S1.

Carleton River—

Bear Lake Brook—6,000 S1.

Payson Brook—6,000 S1.

Seven Pence Ha' Penny River (Wentworth Brook)—15,000 S1.

Toad Brook—27,000 S1.

Church Point Brook—9,000 Sd.

Comeau Brook—3,000 Sd.

Doctor Lake—10,000 S3.

Doucette River—Grosses Coques River—12,000 S1.

Doucette Mill Brook—Grosses Coques River—6,000 S1.

Duffy Brook—3,000 Sd.

Gilbert Brook—12,000 S1.

Handspiker Brook—9,000 S1.

Harris Brook—6,000 S1.

Henderson Brook—6,000 S1.

Holdsworth Brook—3,000 S1.

Jerimie Brook—6,000 S1.

LeMarchant Lake—5,000 S4.

Meteghan River—

At Meteghan Victor's Mills—18,000 S1.

Fluid Lake Brook—18,000 Sd.

Long Lake—6,000 S1.

Mill Brook—18,000 Sd.

Riviere-a-margo—9,000 S1.

Stony Brook—12,000 S1.

Thibault Brook—9,000 Sd.

Perry Brook—6,000 S1.

Post Brook—9,000 S1.

Pine Brook—12,000 S1.

Roach Brook—3,000 S1.

Salmon River—52,440 A1, 13,000 A4.

Dean Brook—18,000 Sd.

Hectanooga Lake—2,000 S4.

Seely Brook—12,000 S1.

*Sissiboo River—*

Amirault Lake—18,000 S1.

Andrews Meadow Brook—9,000 S1.

Doty's Meadow Brook—2,500 S4.

Dunbar Brook—6,000 S1.

Specht Brook—3,000 S1.

Therault Brook—9,000 S1.

Tusket River, East Branch (Silver River)—14,500 A4.

Walsh Brook—3,000 S1.

Young Brook—6,000 S1.

*Shelburne County—*

Barrington River—11,500 A4.

Beaverdam Brook—2,000 S4.

Birchtown Brook—1,000 S4.

Gold Lake Road Brook—12,000 Sd.

Long Bridge Brook—6,000 Sd.

Black Brook (Shelburne Harbour)—24,000 S1.

Clyde River—29,000 A4.

Dirty Creek—15,000 Sd.

Hemlock Creek—27,000 Sd.

McGill Lake Brook—12,000 Sd.

Potter's Run—9,000 Sd.

Purdy Hill Brook—27,000 Sd.

Spring Creek—12,000 Sd.

Stave Creek—9,000 Sd.

Corkum Brook—6,000 Sd.

Downey Brook—600 S4.

Goose Creek—12,000 Sd.

Jordan River—14,500 A4.

Indian Branch Brook—15,000 Sd.

Onemile Brook—9,000 Sd.

Twomile Brook—9,000 Sd.

Threemile Brook—12,000 Sd.

Fourmile Brook—18,000 Sd.

Steep Landing Brook—9,000 Sd.

Little Goose Creek—9,000 Sd.

Roseway River—2,400 S4.

Courtenay Lake—6,000 Sd.

Fox Creek—15,000 S1.

Mark Brook—6,000 S1.

Mill Creek—18,000 S1.

Rob Bowers Brook—12,000 S1.



*Yarmouth County—**Argyle River—*

Long pond Brook—12,000 S1.

Moses Creek—12,000 S1.

*Carleton River—*

Bullerwell Brook—21,000 Sd.

Halfway Brook—9,000 S1.

Hanf Brook—9,000 Sd.

Harding Brook—9,000 Sd.

Hicks Brook—6,000 Sd.

Pond Brook—15,000 Sd.

Ryerson Brook—9,000 Sd.

Salter Brook—9,000 S1.

Sloan Lake—10,000 S3.

Sweeney Brook—9,000 Sd.

Churchill Lake—3,000 S5.

Coggins Lake—7,126 S3.

Dunn Lake—2,700 S4.

Goose Lake Brook—6,000 S1.

Herring Brook—12,000 S1.

Rodney Lake—10,034 S3.

*Salmon River—*

Bull Hill Brook—12,000 Sd.

Crosby Brook—6,000 S1.

Hawley Road Brook—9,000 Sd.

Pleasant Valley Brook—6,000 S1.

Sand pond Brook—12,000 S1.

Stillwater Brook (Pubnico Harbour)—4,985 S1.

Tedford Lake—47,745 S1.

Tusket River—59,280 A1, 56,500 A4.

Back Brook—6,000 S1.

Back Lake Brook—1,000 S4.

Barrio River—6,000 S1.

Braddies Meadow Brook—12,000 S1, 700 S4.

Chocolate Lake Brook—9,000 S1.

Georges Meadow Brook—6,000 S1, 600 S4.

Gray Brook—9,000 S1, 2,000 S4.

James Lake—2,000 S4.

Kegeshook Lake—3,000 S4.

Little Meadow Brook—20,000 S1.

Mill Brook—12,000 S1.

Putty Road Brook—6,000 S1, 200 S4.

Randall Brook—6,000 S1.

Reuben Brook—9,000 S1.

Tinkham Brook—9,000 S1.

Travis Brook—6,000 S1.

Whistler Lake—9,000 S1.

Two Island Lake—2,000 S5.

Welches Brook (Pubnico Harbour)—6,000 S1.

## NEW BRUNSWICK

## CHARLO HATCHERY

Antinori Lake—1,000 S2.

Charlo River, North Branch, above dam—  
450 Sf, 84 Sk.

Christopher Brook—4,918 S3, 200 Sf.

Hariman Lake—860 Sd, 14,140 S1.

Island Lake—5,102 S3, 471 Sf.

Jacquet River—88,670 A1.

Nipisiguit River—150,340 A1, 82,790 A2.

Popelogan Lake—4,000 S2.

Restigouche River—247,330 A1, 438,060 A2.

Kedgwick River—114,970 A1, 68,420 A2.

Matapedia River—153,230 A1, 26,580 A2.

Upsalquitch River—191,550 A1, 101,730 A2.

## FLORENCEVILLE HATCHERY

*Carleton County—*Acker Brook—Saint John River—30,000 Sd,  
15,000 S1, 300 Sf.

Ash Brook—Fewer Lake—30,000 Sd.

Basin Brook—Presquile River—20,000 Sd,  
200 Sf.

Becaguimec River—20,000 A1.

Bennett Lake—200 Sg.

Birmingham Brook—Becaguimec River—  
40,000 Sd, 20,000 S1.

Bubby Brook—Saint John River—750 S4.

Bull Creek—Eel River—20,000 S1, 2,000 S4,  
600 Sf.Bulls Creek—Saint John River—20,000 S1,  
500 Sf.Burke Brook—Shiktahawk River—15,000  
Sd, 10,000 S1.Burnt Land Brook—Becaguimec River—  
40,000 Sd, 20,000 S1.

Burpee Brook—Presquile River—300 Sf.

Buttermilk Creek—Saint John River—  
13,000 Sd.Cold Stream—Becaguimec River—60,000  
Sd, 35,000 S1, 800 Sf.Colton Brook—Shiktahawk River—15,000  
Sd, 5,000 S1.Cross Creek—Becaguimec River—25,000 Sd,  
10,000 S1.Day Brook—Becaguimec River—25,000 Sd,  
15,000 S1.Debec Brook—Sherwood Lake—20,000 S1,  
900 Sf.Dingee Brook—Presquile River—15,000 S1,  
2,000 S4.

Fall Brook—Nackawic River—2,500 S2.

Gallivan Brook—Little Presquile River—  
15,000 Sd, 10,000 S1.Gin Brook—Becaguimec River—20,000 Sd,  
10,000 S1.

Guisiguit River—20,000 S1, 400 Sf.

Hagerman Brook—Meduxnekeag River—  
20,000 Sd, 20,000 S1, 400 Sf.Hardwood Brook—Saint John River—15,000  
Sd, 10,000 S1.Harmon Brook—Saint John River—20,000  
Sd, 10,000 S1.Harold Brook—Presquile River—30,000 Sd,  
10,000 S1.Hatfield Brook—Saint John River—10,000  
S1.Hayden Brook—Becaguimec River—40,000  
Sd, 20,000 S1.Johnville Beaver pond—Shiktahawk River  
—400 Sf.

Knoxford Lake—1,200 Sf.

Lanes Creek—Saint John River—15,000 Sd,  
10,000 S1.

Little Guisiguit River—20,000 S1, 400 Sf.

Little Presquile River—40,000 S1, 1,000 Sf.



Lily Brook—Saint John River—25,000 Sd, 15,000 S1.	Charlie Lake—Shogomoc River—1,000 Sf. Clinch Brook—Little Magaguadavic Lake— 6,500 Lf.
Maynes Brook—Little Presquile River— 25,000 Sd, 10,000 S1.	Cross Creek—Nashwaak River—25,000 S1, 3,400 S4.
McLeary Brook—Lakeville Pond—30,000 Sd, 20,000 S1, 300 Sg.	Davidson Lake—500 Sf.
Meduxnekeag River—15,000 A2.	Dead Creek—Eel River—600 Sf.
Mile Brook—Presquile River—15,000 Sd, 3,000 S1, 1,000 S4.	George Lake—30,000 S1, 3,000 Sf.
Miramichi River, Southwest, North Branch —20,000 A1, 5,000 A2.	Green Hill Lake—Keswick River—300 Sf.
Miramichi River, Southwest, South Branch —50,000 A1, 20,000 A2.	Indian Lake—600 Sf.
Monquart River—25,000 A1, 5,000 A2.	Jones Fork—Keswick River—15,000 S1.
Moose Lake—400 Sf.	Joslin or Waterloo Lake—400 Sf.
Murphy Lake—230 Sk.	Keswick River—20,000 A1, 5,000 A2.
Presquile River—45,000 A1.	Longs Creek—Saint John River—25,000 S1.
River des Chutes—50,000 Sd, 10,000 S1, 600 Sf.	Maataquac River—20,000 A1, 15,000 S1, 4,000 S4.
Rosamond Lake—400 Sk.	McLellan Brook—Eel River—15,000 S1.
Saint John River—200,000 S1.	Middle Brook—Nashwaak River—15,000 S1.
Shikatahawk River—20,000 A1, 5,000 A2.	Mud Lake—500 S4.
Smith Brook—Becaguimec River—10,000 Sd, 5,000 S1.	Nackawick River—20,000 A1, 5,000 A2.
Stickney Brook—Saint John River—10,000 S1.	Nashwaak River—55,000 A1, 15,000 A2.
Sucker Brook—Meduxnekeag River—40,000 Sd, 10,000 S1.	Nashwaakis River—25,000 S1, 600 Sf, 300 Sg.
Teague Brook—Southwest Miramichi River —20,000 A1, 5,000 A2.	Noonan Brook—Portabello Creek—10,000 S1.
Tweedie Brook—Saint John River—6,000 Sd, 750 S4.	Penniac Brook—Nashwaak River—600 Sf.
Two Mile Brook—1,000 S4, 300 Sf.	Pokiok River—15,000 S1, 6,500 S4, 600 Sf.
Williamstown Lake—200 Sh.	Rusagonis River—2,000 S4.
	Rustine (Risteen) Brook—Eel River—10,000 S1, 2,000 S4.
	Shogomoc River—60,000 Sd, 50,000 S1, 600 Sf.
	Skiff Lake—7,100 Lf.
	Taffa Lake—15,000 S1.
	Tay River—10,000 S1.
	Tinkettle Brook—Nashwaak River—10,000 S1.
	Yoho Lake—600 Sf.

*York County—*

Artificial Lake—800 S4.  
Brown Lake—4,000 S4.

## GRAND FALLS HATCHERY

*Victoria County—*

Saint John River and tributaries—350,000  
Ac, 180,000 Ad, 80,000 A1, 241,530 A2.  
Boutout Brook—8,000 S1, 8,000 S3.  
Hatchery Brook, below falls—13,900 S3.  
Little River—100,000 Sc, 85,000 S1, 73,000  
S3.  
Salmon River and tributaries—105,000 Ad,  
280,000 A2.  
Foley Brook—40,000 S1, 8,000 S3.  
Graham Brook—8,000 S3.  
Leslie Brook—4,000 S3.  
Mooney Brook—8,000 S3.  
Otter Slide—8,000 S3.  
Ryan Brook—38,000 S3.  
Sutherland Brook—50,000 Sc, 75,000 S1.  
Tobichery River and tributaries—100,000 A2.  
Pokiok Brook—75,000 S1, 25,570 S3.  
Rocky Brook—2,500 S1.

Three Brooks Deadwater, below dam—  
1,000 S2.  
Trout Brook—8,000 S1.

*Madawaska County—*

Baker Lake—45,000 S3.  
Caron Lake—90,000 S3.  
Five Mile Brook—7,000 S1.  
Grand River—45,000 S3.  
Green River, below dam—90,000 S3.  
Green River, above dam—90,000 S3.  
Iroquois River—45,000 S3.  
Nine Mile Brook—10,000 S1.  
Quisibis River—25,000 S3.  
Siegas River—25,000 S3.  
Three Mile Brook—5,000 S1.  
Trout River—90,000 S3.  
Twin Lakes—Green River—10,000 Sd.  
Two Mile Brook—7,000 S1.  
Unique Lake—90,000 S3.

## MIRAMICHI HATCHERY

Miramichi River, Northwest and tributaries  
—1,008,000 Ad, 115,430 A2.  
Miramichi River, Southwest and tributaries  
—486,000 Ad, 184,800 A1, 19,000 A2.

Miramichi River, Little Southwest—720,000  
Ad.  
Pollett River—152,250 A2.

## SAINT JOHN HATCHERY

*Albert County—*

Fenton Pond—Crooked Creek—5,000 S1.  
Turtle Creek, East Branch—30,000 S1.

*Charlotte County—*

Berry Brook—Waweig River—10,000 S1.  
Chamcook Lake—1,182 Af, 524 Ag, 2,980 L3,  
7,833 Lf, 1,256 Lg.  
Clarence Brook—Digdeguash Lake—20,000  
S1.  
Craig Lake—2,000 S2.  
Creedy Lake—6,750 S3, 675 Sf.  
Digdeguash River—70,000 S1, 36,500 S2.  
Digdeguash River, N.W. Branch—20,000  
S1, 1,000 S2.  
Disappointment or Mistake Lake—3,000 S1.  
Gibson Lake—7,700 S3, 770 Sf.  
Goat Brook—Canoose River—15,000 S1.  
Green Brown Brook—Canoose River—  
20,000 S1, 1,000 S2.

Jones Brook—Digdeguash River—1,000 S2.  
King Brook—St. Croix River—1,000 S2.  
Lake Stream—Magaguadavic River—1,000  
S2.

Maxwell Brook—Denny Stream—1,000 S2.  
McCarlies Brook—Waweig River—10,000  
S1, 1,000 S2.

McDougall Lake—30,000 S2.  
McGuire's Brook—Waweig River—10,000 S1.  
Meadow Brook—Oak Bay—10,000 S1.  
Mohannas Creek—20,000 S1.  
Murchie Brook—Denny Stream—10,000 S1.  
New River—80,000 S2.

*Oromocto River—*

Half Moon Lake—65,000 S1.  
Meadow Brook—20,000 S1, 20,000 A1.  
Sand Brook—20,000 S1.  
Pocologan River—70,000 A1.  
Russel Brook—Canoose River—1,000 S2.  
Sandy Brook—Canoose River—10,000 S1,  
1,000 S2.  
Satchel Brook—St. Croix River—1,000 S2.  
Soap Brook—Mohannas Creek—1,000 S2.  
Spear's Brook—Trout Lake—25,000 S2.  
Utopia Lake—70,000 S2.  
Waweig River—10,000 S1, 1,000 S2.

*Kent County—*

Big Forks Brook—5,000 S5.  
Buctouche River—85,000 S1, 6,750 S2.  
Coal Branch River—30,000 S1.  
Little Forks Brook—5,000 S5.  
Mahalawodiack River or McKee Mill Stream  
—35,000 S1.  
Richibucto River—25,000 S1, 26,750 S2.  
St. Nicholas River—60,000 S1.

*Kings County—*

Butler Lake—10,000 Sd.  
Chisholm Lake—1,000 S2.  
Hammond River—65,000 S2.  
Kennebecasis River—  
South Branch—4,750 S2.  
Chestnut Brook—35,000 S1.  
Drury Cove Brook—25,000 S1, 4,500 S2.  
King Brook—30,000 S1.  
McGregor Brook—15,000 S1, 4,250 S2.  
McLeod Brook—30,000 S1, 4,750 S2.  
Mitchell Brook—25,000 A1.

Moosehorn Creek—25,000 A1.  
Studdholm Brook or Millstream—40,000  
S1, 25,000 S2.  
Parlee Brook—10,000 S1.  
Rockville Brook—4,500 S2.  
Sally Brook—35,000 S1.  
Sharp Brook—20,000 S1.  
Smith Creek—15,000 S2.  
Stone Brook—3,500 S2.  
Trout Creek—60,000 A1.  
Ward Creek—55,000 S1, 4,750 S2.

McFarlane Lake—3,500 S5.  
Midland or Sherwood Brook—45,000 S1.  
Ox Shoe Lake—10,000 Sd.  
Palmer Brook—Hammond River—20,000  
S2, 50,000 A1.  
Ray's Lake—5,000 R2.  
West Lake—Saint John River—4,000 S4.

*Queens County—*

Alward Brook—15,000 S1, 1,000 S2.  
Bogel Lake—150 Sf.  
Canaan River—20,000 S1.  
Coy Brook—3,500 S5.  
Forks Stream—Canaan River—10,000 S1,  
1,000 S2.  
Morgan Lake—1,000 S2.  
Perley Brook—3,500 S5.  
Queen Lake—20,000 S1.  
Salmon River—25,000 S2, 40,000 A3.  
Square Lake—Nerepis River—20,000 S1.

*Saint John County—*

Adams Lake—4,000 S1, 1,000 S2.  
Back Dam—Saint John River—2,000 S1.  
Beaver Brook—Mispek River—5,000 S1.  
Big Salmon River—35,000 A2, 17,526 A3.  
Black River—30,000 S1, 5,000 S2.  
Black River, East—40,000 S1.  
Blindman Lake—300 Sg, 200 Sh.  
Boaz Lake—2,500 S1.  
Brandy Brook—5,000 S1.  
Cedar Pond—100 Sf.  
Cherry Lake—3,000 S1.  
Crow Brook—10,910 R2.  
Dead Brook—Loch Lomond—25,000 S1.  
Dolan Lake—25,000 S1.  
Douglas Lake—10,000 S2.  
Elderly Brook—Little River—20,000 S1.  
Germaine Brook—40,000 S1, 10,000 S2.  
Graham Lake—5,000 S1.  
Grassy Lake—Black River—10,000 S1.  
Hanford Brook—20,000 S1, 5,000 S2.  
Hanson River—15,000 S2.  
Hayns Lake—10,000 S1, 5,000 S2.  
Henry Lake—25,000 S1.  
Howe Lake—2,000 S1.  
Kelly Lake—Saint John River—10,000 S1.  
Lilus Lake—10,000 S1.  
Lily Lake—Rockwood Park—211 Sg, 189  
Sh.  
Little River—1 Ak, 38 Rf, 16 Rk, 25,000 S2,  
307 Sf, 145 Sg, 24 Sh.  
Loch Alva (Saint John & Kings Cos.)—  
43,000 S1.  
Loch Lomond—95,000 S1, 1,800 Sg.  
Mayflower or Dark Lake—9,000 S1.  
McCormac Lake—30,000 S1, 2,000 S4.

Millican Lake—20,000 S1.  
 Mispek River—45,000 S1, 15,000 S2.  
 Musquash River, West Branch—20,000 S1,  
 5,000 S2.  
 Musquash River, East Branch—475 Sg.  
 Robinson Lake—1,000 S1.  
 Round Lake—Nelson Lake—50,000 S1,  
 10,000 S4.  
 Second Lake—Loch Lomond—40,000 S1,  
 10,000 S2.  
 Stephenson's Pond—Loch Lomond—5,000  
 S1.  
 Taylor Lake—8,000 S1, 2,000 S2.  
 Third Lake—Loch Lomond—25,000 S1,  
 10,000 S2.  
 Treadwell Lake—10,000 S1, 5,000 S2, 395 Sg.  
 Tynemouth or Ten Mile Creek—30,000 A1.  
 Wilmot Stream—Loch Lomond—75,000 S1.

#### *Sunbury County—*

Hatch Lake—1,000 S2.  
 Little River—3,000 S5.  
 Newcastle Creek—45,000 S2.  
 Oromocto River—40,000 S1.  
 Back Creek—20,000 A1.  
 Big Morance Brook—50,000 S1, 5,000 S2.  
 Boone Brook—20,000 S1, 3,000 S2.

Fitches Creek—50,000 S1.  
 Hardwood Creek—2,000 S2.  
 Monday Brook—50,000 S1.  
 Northwest Branch—2,000 S2.  
 Otter Brook—2,000 S2.  
 Scribner Brook—20,000 S1.  
 Spring Brook—5,000 S2.  
 Three Tree Creek—50,000 S1, 5,000 S2.  
 Tracy Brook—20,000 S1.

#### *Westmorland County—*

Cocagne River (Kent & Westmorland Cos.)  
 —55,000 S1, 6,500 S2.  
 Folly Lake—410 S1, 4 Sf, 3 Sg, 1,000 A1,  
 3 Ag, 3 Rg.  
 Prices Brook—20,000 Sd, 15,000 S1, 1,000 S2.

#### *York County—*

Big Cranberry or Harvey Lake—10,000 S2.  
 Magaguadavic River—  
 Big Cranberry Stream—30,000 S1.  
 Cranberry Brook—50,000 S1.  
 Davis Brook—100,000 S1.  
 Midland Stream—50,000 S1.  
 Mink Lake—30,000 S1.  
 Oromocto River—  
 Beaver Brook—20,000 S1.  
 Yoho Brook—20,000 S1.

### PRINCE EDWARD ISLAND

#### CARDIGAN PONDS

#### *Kings County—*

Bear River—6,000 S2.  
 Big Pond (Hermanville)—15,000 S3.  
 Big Brook—Fortune River—15,000 S1.  
 Brudenell River—10,000 S1, 10,000 S2.  
 Buell's Brook—Murray River—3,000 S3.  
 Burge's Pond—St. Peter Bay—2,000 S3.  
 Cardigan River—8,000 S2.  
 Crane's Pond—Morell River—10,000 S2.  
 Creed's Pond—Sturgeon River—5,000 S3.  
 Dingwell's Stream—Fortune River—6,000  
 S3.  
 Finlayson's Pond—Greek River—6,000 S3.  
 Fitzpatrick's Pond—Seal River—3,000 S1.  
 Fox River—2,000 S3.  
 Goose or Cow River—5,000 S2, 3,000 S3.  
 Hay River—5,000 S2.  
 Jenkin's Pond—Greek River—2,000 S3.  
 Leard's Pond—Morell River—12,000 S2.  
 MacLeod's Pond—Murray River—5,000 S3.  
 McAulay's Stream—Morell River—4,000 S2.  
 McDonald's Pond—North Lake—3,000 S3.  
 McEwan's Pond—Savage Harbour—2,000  
 S1.  
 McKinnon Stream—Morell River 10,000 S2.  
 McLeod's Pond—Midgell River—6,000 S1.  
 McPherson's Pond—Montague River—8,000  
 S2.  
 McRae's Pond—Montague River—8,000 S2.  
 Montague Pond—10,000 S2.  
 Mooney's Pond—Morell River—4,000 S2.  
 Morell River—46,060 A3.  
 Munn's Brook—Brudenell River—3,000 S1.  
 Narrow Creek—Boughton River—3,000 S1.  
 Naufrage River—10,000 S2.  
 North Lake—6,000 S3.  
 Poole's Pond—Montague River—2,000 S3.  
 Priest Pond (Bayfield)—5,000 S3.

Quigley's Pond, Head of St. Peter Bay—  
 4,000 S1.  
 Ross' Pond—Boughton River—10,000 S3.  
 Sturgeon River—4,000 S2.  
 Webster's Pond—Marie River—6,000 S1.  
 Whitlock's or Morrison's Pond—Boughton  
 River—20,000 S3.  
 Wigginton's Brook—Boughton River—5,000  
 S1.

#### *Prince County—*

Barbara Weit River—6,000 S3.  
 Brae River—3,000 S2.  
 Cain's Stream—Mill River—6,000 S2.  
 Clark's Pond—Wilmot River—9,000 S2.  
 Dunk River—12,000 S3.  
 Enmore River—2,000 S2.  
 Gard's Pond—Mill River—4,000 S2.  
 Green's Stream—Miminegash Pond—4,000  
 S2.  
 Marchbank's Pond—Trout River (Tyne  
 Valley)—4,000 S2.  
 McArthur's Pond—Foxley River—2,000 S2.  
 McWilliams Pond—Pierre Jacques River—  
 4,000 S2.  
 Myrick's Pond—Little Tignish River—4,000  
 S2.  
 Old Woollen Mills Pond—Tryon River—  
 4,000 S3.  
 St. Nicholas Pond—Sunbury Cove—4,000  
 S2.  
 Sheen's Pond—Trout River (Tyne Valley)—  
 4,000 S2.  
 Sheep River—4,000 S2.  
 Tignish River—5,000 S2.  
 Tuplin's Pond—Indian River—4,000 S2.  
 Wright Leard's Pond—Dunk River—4,000  
 S3.



*Queen's County—*

Ballem's Stream—Pownal Bay—3,000 S2.  
 Bagnall's Pond—Hunter River—5,000 S2.  
 Beaton's Mill Pond—Flat River—2,384 S3.  
 Beer's Pond—Clyde River—6,000 S2.  
 Bell River—8,000 S3.  
 Burgoine's Pond—Stanley River—4,000 S3.  
 Cook's Pond—Newton River—3,000 S3.  
 Craswell's Pond—Hunter River—6,000 S2.  
 Found's Pond—Stanley River—3,000 S3.  
 Gurney's Stream—Covehead Bay—10,000 S2.  
 Hope River—6,000 S2.  
 Howell's Brook—West River—6,000 S2.  
 Lane's Brook—Vernon River—3,000 S2.  
 McAulay's Stream—Tracadie Bay—3,000 S3.  
 McMillan's Pond—Vernon River—3,000 S1.

McMillan's Pond (Wood Islands)—6,000 S3.  
 McPherson's Pond—Flat River—3,000 S3.  
 McPherson's Pond—Pinette River—6,000 S3.  
 Milton Stream—North River—9,000 S1.  
 Parson's Pond—Glyne River—6,000 S2.  
 Percy Howett's Pond—Stanley River—2,065 S3.  
 Pisquid or O'Keefe's Lake—1,056 R2.  
 Ross' Pond—Vernon River—6,000 S1.  
 Scott's Pond—Clyde River—6,000 S3.  
 Skye Brook—West River—3,000 S2.  
 Southwest River—3,000 S2.  
 Upper Simpson Pond—Hope River—10,000 S4.  
 Watt's Stream—Winter River—4,000 S2.  
 West River—9,000 S2.  
 Winter River—1,417 S2, 10,583 S3.  
 Winter River—North Branch—3,000 S3.

## KELLY'S POND HATCHERY

*Kings County—*

Big Brook—Fortune River—10,000 S1.  
 Big Pond (Hermanville)—9,000 S1.  
 Crane's Pond—Morell River—14,000 S1.  
 Dingwell's Stream—Fortune River—6,000 S1.  
 East or Hillsborough River—6,000 S1.  
 Goose or Cow River—8,000 S1.  
 Graystone Creek—Boughton River—5,000 S1.  
 Hooper's Pond—St. Peter's Lake—8,000 S1.  
 Larkin's Pond—Naufrage River—15,000 S1.  
 Leard's Pond—Morell River—25,000 S1.  
 McRae's Pond—Montague River—10,000 S1.  
 Midgell River—50,000 Ad.  
 Montague Pond—14,000 S1.  
 Morell River—357,410 Ad.  
 Narrow Creek—Boughton River—8,000 S1.  
 Naufrage River—10,000 S1.  
 Ross' Pond—Boughton River—10,000 S1.  
 St. Peter Bay, head of—50,000 Ad.

*Prince County—*

Barlow Pond—Grand River—4,000 S1.  
 Bell's Stream—Mill River—4,000 S1.  
 Bell's Stream—Prevost Cove—4,000 S1.  
 Brae River—4,000 S1.  
 Carr's Pond—Malpeque Bay—4,000 S1.  
 Clark's Pond—Wilmot River—10,600 S1.  
 Conroy's Pond (Cape Kildare)—4,000 S1.  
 Currie's Pond—Lit. Pierre Jacques River—8,000 S1.  
 Dunk River—16,000 S1.  
 Enmore River—4,000 S1.  
 Fitzgerald's Pond—Grand River—4,000 S1.

Ives' Pond—Tryon River—5,000 S1.  
 Leard's Pond—Trout River tributary to lot 10 River—4,000 S1.  
 Marchbank's Pond—Trout River (Tyne Valley)—4,000 S1.  
 McAusland's Pond—Mill River—5,000 S1.  
 McNally's Pond—Jacques River—4,000 S1.  
 Rix's Pond—Kildare River—8,000 S1. I  
 Round Pond (Greenmount)—4,000 S1.  
 Waddell's Pond—Traverse Cove—4,000 S1.  
 Wright Leard's Pond—Dunk River—10,000 S1.

*Queens County—*

Bagnall's Pond—Hunter River—8,000 S1.  
 Black River—Covehead Bay—5,000 S1.  
 Black River—Tracadie Bay—6,000 S1.  
 Brander's Pond (Seaview)—3,000 Sd.  
 Clark's Stream—East River—12,000 S1.  
 Coles' Pond—North River—8,000 S1.  
 Cousins Pond (Seaview)—4,000 Sd.  
 Craswell's Pond—Hunter River—6,000 S1.  
 Crooked Creek—Wheatley River—4,000 S1.  
 Dixon's Pond—De Sable River—8,000 S1.  
 Gates' Pond—North River—4,000 S1.  
 Glenfinnan River—10,000 S1.  
 Holmes' Pond—De Sable River—4,000 S1.  
 Johnston's River—6,000 S1.  
 Leard's Pond—Crapaud River—8,000 S1.  
 MacLean Brothers Pond—West River—5,000 S1.  
 Rackham's Pond—Wheatley River—10,000 S1.  
 Stordy's Pond—Crapaud River—4,000 S1.  
 West River—20,000 S1.  
 Winter River—15,000 S1.



**REPORT BY DIRECTOR OF COMMERCIAL TRANSACTIONS  
(F. A. C. HARRISON) ON RETURNS TO CANADA FROM PRIBILOF  
FUR SEAL OPERATIONS 1947-48**

Under the Provisional Fur Seal Agreement 1942 between the two countries Canada receives from the United States 20 per cent of the annual 'take' of fur seal skins at the Pribilof Islands. The 1942 agreement replaced the four-power Pelagic Sealing Treaty 1911. All seal hunting at the Pribilof rookeries is carried on under the United States Government.

The 1947 take at the rookeries numbered 61,447 skins and Canada's share was thus 12,289 skins. Total take of pelts was some 3,000 fewer than in the preceding year but the population of the seal herd was estimated at slightly more than 3,600,000 animals, an increase of 6.7 per cent over the 1946 estimate. When the 1911 treaty was signed the herd numbered only 125,000 seals and under the control which was exercised first under the treaty and latterly under the Provisional Agreement it has increased steadily in size year by year.

Fur seal skins have always been dressed and dyed before being offered for sale to the fur trade. The processing of the skins is a long, complicated procedure, taking from three to four months and involving some 130 separate operations. The secret methods are practised by only two firms in the world, one in England, the other in the United States.

Previous to 1933 Canada did not take its share of skins in kind, but by arrangement with the United States Government received a proportionate share of the proceeds of the sale of the skins by that Government. In 1933 Canada had its share of skins dressed and dyed for it in London and sold on the London fur market. This arrangement was not altogether satisfactory and in 1939 the selling of the skins was transferred to Montreal where a very keen demand has been developed.

During the war, owing to slow delivery of finished skins from England, and due to demands of the trade, some of Canada's skins were sent to the St. Louis firm for processing. Our sealskins are now divided between the two firms for dressing and dyeing and are all sold by auction in Montreal.

Of Canada's share of skins last year 30 per cent were sent to London for processing and 70 per cent to St. Louis. These skins are now in various stages of processing and it is expected that most of them will be offered for sale during the coming fiscal year.

During the past fiscal year five sales were held in Montreal at which a total of 17,034 dressed skins were offered, (9,893 London dye, 7,141 St. Louis dye). All were sold for a total amount of \$814,500. Fur prices in general at the beginning of the year were somewhat low, but they improved and at the last few sales were fairly high. The top prices received for skins during the year were, St. Louis dyed \$102. and London dyed \$76.

Payment by the United States Government for the last of the skins which Canada had left with it for sale brought total receipts of \$824,971.86. Expenditures for processing, freight and other expenses were \$280,802.95, which meant that the net receipts to the Canadian Government for the fiscal year 1947-48 totalled \$544,168.91.

## REPORT OF THE ENGINEERING DIVISION, 1947-48

By H. A. LYNCH, *Chief Engineer*

On the West Coast work on the removal of obstructions was carried out on the following rivers and streams: Beaver River, Bottleneck Creek, Call Creek, Che-mainus River, Coal Creek, Cowichan River, Crescent Creek, Dally Creek, Effing-ham River, Evelyn River, Nanoose Creek, Price Creek, Quinimas River, Riordan Creek, Robbers Knob Creek, Ronald Creek and Tzoonie River.

The concrete fishway at Stamp Falls was repaired.

*East Coast*—Numerous examinations were made of obstructions in various rivers on the East Coast and recommendations made for their removal. Surveys were made and plans prepared for fishways at Blackville, N.B., Forshner Brook, N.S., Great Salmon River, N.B., Salters Falls on the Medway River, N.S., Moose Lake, N.S., Nictaux, N.S., Roseway River, N.S., Salmon River Digby County, N.S., and Sydney River, N.S.

An examination was made and two old dams obstructing the Nashwaak River, N.B., at Lower Lake and the Narrows were removed.

## FISH CULTURAL ESTABLISHMENTS

Work done in connection with departmental hatchery establishments during the year included the following:

*Bedford Hatchery, N.S.*—The whole back wall of the hatchery was straightened, re-silled and studded and a buckle taken out of the roof.

*Florenceville Hatchery, N.B.*—A new building, housing cold storage, feed room, workshop and storage space was constructed.

*Grand Falls, N.B.*—A new double garage, cold storage, workshop, feed room, ice house and storage was completed.

*Grand Lake, N.S.*—A double garage, workshop and storage was built.

*Kejimikujik Ponds, N.S.*—An inspection was made and an estimate prepared for repairs to dam.

*Margaree Hatchery, N.S.*—A new concrete floor was placed in the hatchery and a new double garage cold storage workshop, etc., was built.

*Margaree Salmon Pond, N.S.*—The pond cribwork which had been damaged by storms was partly repaired.

*Mersey Ponds, N.S.*—Four new longitudinal concrete ponds were built, each 58 feet 0 inches long by 6 feet 0 inches wide.

*Middleton, N.S.*—A new furnace was installed in the dwelling.

*New Mills, N.B.*—Survey made and plans prepared for the construction of new dams for the salmon pond.

*River Phillip, N.S.*—Wood dam designed and constructed to close run around at salmon pond.

*Tobique Rearing Ponds, N.B.*—At Haley Brook work was started on the construction of a new rearing pond establishment, a survey made, the area cleared and grubbed and a construction shack erected.

## GENERAL

*Gaspe Fisheries Experimental Station*—The concrete seawall was completed, and a dwelling built at Grand River, P.Q., for the Director.

*Prince Edward Island*—A wood crib dam was built for the Fisheries Research Board at Simpsons and surveys made for additional pond sites at Andrews, Stevensons and Wakelins.

Surveys were made and plans prepared for dams on the LaHave River at Wentzells Lake, N.S., and Moose Lake, N.S.

## STATEMENT OF FISHING BOUNTY FOR THE SEASON 1947

By E. K. TURNER, *Chief Treasury Officer*

The basis of distribution for 1947 was as follows: (1) To owners of vessels entitled to receive bounty, \$1 per registered ton, payment to the owner of any one vessel not to exceed \$80; (2) to vessel fishermen entitled to receive bounty, \$8.45 each; (3) to owners of boats measuring not less than twelve foot keel, \$1 per boat; (4) to boat fishermen entitled to receive bounty \$7.95 each.

Payments for the season of 1947 amounted in all to \$159,992.75, allotted as follows:

To 973 vessels and their crews.....	\$ 48,090.45
To 7,904 boats and their crews.....	111,902.30
	<hr/>
	\$159,992.75

## DEPARTMENT OF FISHERIES

1947-48

Province and County	Boats	Men	Amount	Vessels	Tons	Average Tons	Men	Amount	Total Amount
			\$ cts.					\$ cts.	\$ cts.
<b>NOVA SCOTIA—</b>									
Annapolis.....	206	302	2,592.10						2,592.10
Antigonish.....	91	127	1,100.65						1,100.65
Cape Breton.....	209	336	2,872.15						6,863.50
Cumberland.....	4	4	35.80	85	1,273	15	323	3,991.35	35.80
Digby.....	258	443	3,779.85	42	402	12	87	1,227.15	5,007.00
Guysboro.....	416	615	5,289.15	47	606	12	128	1,687.60	6,976.75
Halifax.....	785	1,123	9,700.20	28	454	13	105	1,341.25	11,041.45
Inverness.....	116	229	1,927.35	27	343	13	120	1,337.20	3,264.55
Kings.....	50	67	582.65						582.65
Lunenburg.....	639	768	6,744.60	57	2,452	43	750	8,789.50	15,534.10
Pictou.....	15	24	205.80						205.80
Queens.....	154	231	1,990.45	26	393	15	74	1,018.30	3,008.75
Richmond.....	298	571	4,837.45	31	392	13	95	1,194.75	6,032.20
Shelburne.....	510	830	7,091.25	177	2,387	13	552	7,051.40	14,142.65
Victoria.....	155	238	2,047.10	10	124	12	30	377.50	2,424.60
Yarmouth.....	124	267	2,236.30	82	1,176	14	277	3,516.65	5,752.95
<b>Totals.....</b>	<b>4,030</b>	<b>6,175</b>	<b>53,032.85</b>	<b>612</b>	<b>10,092</b>	<b>16</b>	<b>2,541</b>	<b>31,532.65</b>	<b>84,565.50</b>
<b>NEW BRUNSWICK—</b>									
Charlotte.....	131	245	2,078.75	28	293	11	80	969.00	3,047.75
Gloucester.....	405	751	6,352.45	114	2,270	20	460	6,157.00	12,509.45
Kent.....	172	298	2,529.60	19	239	13	42	593.90	3,123.50
Northumberland.....	32	61	516.95	33	404	12	71	1,003.95	1,520.90
Restigouche.....	3	7	58.65						58.65
Saint John.....	14	21	180.95						180.95
Saint Mary's.....	62	109	928.55						928.55
<b>Totals.....</b>	<b>819</b>	<b>1,492</b>	<b>12,645.90</b>	<b>194</b>	<b>3,206</b>	<b>17</b>	<b>653</b>	<b>8,733.85</b>	<b>21,369.75</b>
<b>PRINCE EDWARD ISLAND—</b>									
Kings.....	242	346	2,990.40						2,990.40
Prince.....	446	799	6,755.50	1	80	80	6	130.70	3,121.10
Queens.....	160	283	2,409.85						6,755.50
<b>Totals.....</b>	<b>848</b>	<b>1,428</b>	<b>12,155.75</b>	<b>1</b>	<b>80</b>	<b>80</b>	<b>6</b>	<b>130.70</b>	<b>2,409.85</b>
<b>QUEBEC</b>									
Bonaventure.....	215	426	3,590.20						3,590.20
Caspe.....	1,087	2,035	17,234.20	32	426	13	121	1,448.45	5,038.65
Magdalen Islands.....	183	420	3,322.00	134	1,928	14	514	6,254.80	23,489.00
Matane.....	26	40	347.00						3,522.00
Saguenay.....	693	1,092	9,374.40						347.00
<b>Totals.....</b>	<b>2,207</b>	<b>4,013</b>	<b>34,067.80</b>	<b>166</b>	<b>2,354</b>	<b>14</b>	<b>635</b>	<b>7,703.25</b>	<b>41,771.05</b>
<b>GRAND TOTALS.....</b>	<b>7,904</b>	<b>13,108</b>	<b>111,902.30</b>	<b>973</b>	<b>15,732</b>	<b>16</b>	<b>3,835</b>	<b>48,090.45</b>	<b>159,992.75</b>

NOTE:—A number of late claims amounting in all to \$1,787.65 and which are included in this statement are for the season of 1946.

As the basis of distribution for 1946 differed from that of 1947 a number of figures in the "Amount" column do not, as a result, balance with the number of claims paid.



## FINANCIAL REPORT

STATEMENT OF REVENUE RECEIVED DURING FISCAL YEAR 1947-48

Class of Revenue	Total	General Account	Nova Scotia	Prince Edward Island	New Brunswick	Ontario	Quebec	Manitoba	British Columbia	Northwest Territories	Yukon
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Privileges, Licences and Permits—</i>											
Fishing Licences.....	47,131.75		9,676.50	1,550.00	10,271.25	1.00			23,306.00	1,655.00	672.00
Fishing Vessels.....	3,325.20		207.00						118.00		
Oyster Leases.....	3,118.34		490.87	2,292.01	1,132.46						
Traveler Licences.....	10,166.67		10,066.67								
Rentals (of lands and buildings).....	362.25	5.00	245.00		110.25				2.00		
<i>Proceeds from Sales—</i>											
Pelagic Sealing (Sales of Skins).....	893,362.70										
Sales of Fingeringes and Fish Fry.....	602.20				602.20						
Sales of Oyster Spats, etc.....	2,675.50			2,675.50							
Sundry Sales.....	3,575.73	3,086.72	198.32	8.00	10.60		86.00	8.61	177.48		
<i>Service and Service Fees—</i>											
Canned Salmon Inspection Fees.....	7,666.16								7,666.16		
Canned Herring Inspection Fees.....	6,524.85								6,524.85		
Miscellaneous Services.....	410.00		410.00								
Canned Pickard Inspection Fees.....	6.61								6.61		
Rental of Equipment.....	8.16								8.16		
<i>Refunds of Previous Years' Expenditure.....</i>	5,663.55	606.66	407.18	3,983.19	33.19		59.80		573.53		
<i>Miscellaneous—</i>											
Premiums on Foreign Exchange Transactions.....	1.83	.40	.30	.85	.28						
Fines and Forfeitures—											
Fisheries Act.....	13,677.20		758.00	1,591.20	2,758.00			45.00	8,525.00		
Forfeitures.....	10,523.51			128.50	263.49				10,131.52		
Conscience Money.....	4.00	4.00									
Northern Pac. Halibut Protection Act.....	584.17								584.17		
Damages to FPC Merrysea II.....	5,000.00	5,000.00									
Sundry.....	6.90	6.90									
GRAND TOTAL.....	1,012,694.08	902,072.38	23,059.84	12,229.25	15,181.72	1.00	145.80	53.61	57,623.48	1,655.00	672.00

Certified Correct,  
E. K. TURNER,  
Chief Treasury Officer.

Certified Correct,  
STEWART BATES  
Deputy Minister.

## DEPARTMENT OF FISHERIES

COMPARATIVE FISCAL STATEMENT  
DEPARTMENT OF FISHERIES 1947-1948

Appropriation	Expenditure 1947-48	Expenditure 1946-47	Increase or Decrease
<b>ORDINARY EXPENDITURE</b>			
Miscellaneous Civil Service Gratuities.....	\$ 390.00	\$ 994.00	—\$ 604.00
Minister's Salary and Motor Car Allowance.....	11,289.25	12,000.00	— 710.75
Departmental Administration.....	197,856.29	158,526.43	+ 39,329.86
Fisheries Inspection, including Fishery Officers and Guardians, Fisheries Patrol and Protection Service.....	1,812,802.93	1,595,636.72	+ 217,166.21
Building Fishways and Clearing Rivers.....	8,335.29	4,630.50	+ 3,704.79
Educational Extension Service, including grant of \$3,000 to Lunenburg Fisheries Exhibition.....	30,414.06	24,572.37	+ 5,841.69
Fish Culture.....	277,944.16	221,579.73	+ 56,364.43
Oyster Culture.....	33,572.40	24,308.55	+ 9,263.85
Fisheries Research Board of Canada—			
Operation and Maintenance.....	788,636.81	664,362.99	+ 124,273.82
Construction and Improvements.....	33,350.07	52,965.77	— 19,615.70
International Fisheries Commission (Halibut).....	28,517.16	25,775.10	+ 2,742.06
International Pacific Salmon Fisheries Commission.....	91,341.15	39,043.24	+ 52,297.91
International Pacific Salmon Fisheries Commission (Hell's Gate).....	126,914.93	169,480.99	— 42,566.06
Grant to United Maritime Fishermen's Association.....	3,000.00	3,000.00	.....
Expenses re: Pelagic Seal Skins.....	469,985.76	419,885.34	+ 50,100.42
To provide for the destruction of Harbour Seals.....	22,820.00	21,960.00	+ 860.00
Fishing Bounty.....	159,992.75	159,992.85	— .10
Total Ordinary Expenditure.....	<u>\$4,097,163.01</u>	<u>\$3,598,714.58</u>	<u>+\$498,448.43</u>
<b>SPECIAL EXPENDITURE</b>			
To provide for the extension of educational work in co- operative producing and selling among fishermen....	65,539.16	54,880.23	+ 10,658.93
To provide for the administrative expenses of the Fish- eries Prices Support Act, 1944.....	34,336.54	.....	+ 34,336.54
To provide for assistance in the construction of vessels of the dragger and/or long liner type, subject to such terms and conditions as may be approved by the Governor in Council.....	40,504.20	.....	+ 40,504.20
To provide for the construction of a vessel of particular design for experimental fishing for herring and mackerel.....	8,908.72	42,659.36	— 33,750.64
To provide for assistance in the construction of bait freezing and storage facilities, subject to the ap- proval of the Governor in Council.....	.....	.....	.....
Items not required in 1947-48.....	.....	3,764.36	— 3,764.36
Total Special Expenditure.....	<u>\$ 149,288.62</u>	<u>\$ 101,303.95</u>	<u>+\$ 47,984.67</u>
<b>DEMobilIZATION AND RECONVERSION</b>			
Salt Fish Export Regulations—Administration.....	11,258.54	16,229.53	— 4,970.99
To provide for expenses in connection with administra- tion of the Canned Fish Regulations.....	.....	9,018.09	— 9,018.09
To provide for assistance in the construction of the Dragger Type and the conversion of fishing schoons- ers to Draggers—To Complete agreements.....	57,255.84	87,815.96	— 30,560.12
Items not required in 1947-48.....	.....	26,072.30	— 26,072.30
Total Demobilization and Reconversion....	<u>\$ 68,514.38</u>	<u>\$ 139,135.88</u>	<u>—\$ 70,621.50</u>
GRAND TOTAL.....	<u>\$4,314,966.01</u>	<u>\$3,839,154.41</u>	<u>+\$475,811.60</u>

Open Accounts	Balance close of 1946-47	CURRENT YEAR		Balance close of 1947-48
		Receipts	Disburse- ments	
LOANS AND ADVANCES				
B.C. Government—				
Herring and Pilchard				
Investigation.....	\$ 1,339.16	\$ 1,339.16		
Shellfish Investigation.....	271.04	271.04		
Scale Collection, etc.....	82.73	82.73	\$ 217.94	\$ 217.94
United States Government—				
Pacific Halibut Treaty.....	23,302.62	17,751.12	5,757.82	11,309.32
Pacific Salmon Treaty.....	26,670.71	22,548.26	45,551.72	49,674.17
Pacific Salmon Treaty (Hell's Gate).....	159,891.97	159,890.50	30,119.48	30,120.95
	\$211,558.23	\$201,882.81	\$ 81,646.96	\$ 91,322.38
Atlantic Herring Investigation.....	523.98 (Cr)	60,000.00	57,849.70	2,674.28 (Cr)
United Kingdom General Settlement Account (Finance Dept.).....			2,574.20	2,574.20
	\$211,034.25	\$261,882.81	\$142,070.86	\$ 91,222.30

Certified Correct,  
E. K. TURNER,  
*Chief Treasury Officer.*

Certified Correct,  
STEWART BATES,  
*Deputy Minister.*

DETAILS OF EXPENDITURE 1947-48  
AND COMPARISON WITH EXPENDITURE FOR 1946-1947

Description	Expenditure 1947-48	Expenditure 1946-47	Increase or Decrease
Departmental Administration—			
Salaries and Wages.....	\$ 173,466.23	\$ 135,358.71	+\$ 38,107.52
Other Paylist Items.....	426.98	1,882.00	— 1,455.02
Printing and Stationery.....	6,359.51	4,426.43	+ 1,933.08
Travelling Expenses.....	7,702.17	8,056.67	— 354.50
Sundries.....	9,901.40	8,802.62	+ 1,098.78
	\$ 197,856.29	\$ 158,526.43	+\$ 39,329.86
Fisheries Inspection, including Fishery Officers and Guardians, and Patrol and Protection Services—			
Salaries and Wages.....	1,090,847.33	793,554.72	+ 297,292.61
Other Paylist Items.....	3,393.54	26,422.22	— 23,028.68
Allowances (Board for Crews).....	40,282.68	19,540.73	+ 20,741.95
Printing and Stationery.....	19,105.82	25,866.57	— 6,760.75
Travelling Expenses.....	213,034.89	168,126.83	+ 44,908.06
Supplies, etc. Patrol and Protection Boats.....	286,272.86	392,145.02	— 105,872.16
Repairs to Patrol and Protection Boats.....	78,502.27	58,502.49	+ 19,999.78
Miscellaneous.....	81,363.54	46,668.76	+ 34,694.78
Acquisition of Vessels.....		60,000.00	— 60,000.00
Living Allowances.....		4,809.38	— 4,809.38
	\$1,812,802.93	\$1,595,636.72	+\$217,166.21

## DEPARTMENT OF FISHERIES

Description	Expenditure 1947-48	Expenditure 1946-47	Increase or Decrease
<b>Building Fishways and Clearing Rivers—</b>			
Wages.....	1,362.00	1,334.20	+ 27.80
Travelling Expenses.....	1,398.74	1,482.34	— 83.60
Sundries.....	5,574.55	1,813.96	+ 3,760.59
	\$ 8,335.29	\$ 4,630.50	+\$ 3,704.79
<b>Education Extension Service—</b>			
Salaries and Wages.....	6,315.00	6,644.55	— 329.55
Other Paylist Items.....		1.26	— 1.26
Printing and Stationery.....	5,366.57	3,138.89	+ 2,227.68
Travelling Expenses.....	3,797.75	3,769.59	+ 28.16
Supplies and Materials.....	2,264.99	4,938.65	— 2,673.66
Grant to Lünenburg Fisheries Exhibition.....	3,000.00		+ 3,000.00
Sundries.....	9,669.75	6,079.43	+ 3,590.32
	\$ 30,414.06	\$ 24,572.37	+\$ 5,841.69
<b>Fish Culture—</b>			
Salaries and Wages.....	\$ 140,627.85	\$ 127,655.00	+\$ 12,972.85
Other Paylist Items.....	225.74	187.57	+ 38.17
Allowances in lieu of dwelling.....	373.61	457.14	— 83.53
Printing and Stationery.....	840.69	446.05	+ 394.64
Travelling Expenses.....	9,405.53	8,019.10	+ 1,386.43
Supplies.....	59,440.97	51,237.46	+ 8,203.51
Repairs.....	36,784.42	24,436.19	+ 12,348.23
Construction.....	20,306.52		+ 20,306.52
Miscellaneous.....	9,938.83	9,141.22	+ 797.61
	\$ 277,944.16	\$ 221,579.73	+\$ 56,364.43
<b>Oyster Culture—</b>			
Salaries and Wages.....	22,702.09	16,241.25	+ 6,460.84
Other Paylist Items.....	102.66	37.67	+ 64.99
Travelling Expenses.....	4,611.69	3,982.60	+ 629.09
Sundries.....	6,155.96	4,047.03	+ 2,108.93
	\$ 33,572.40	\$ 24,308.55	+\$ 9,263.85
<b>Fisheries Research Board of Canada—</b>			
<b>Operation and Maintenance—</b>			
Salaries and Wages.....	483,673.85	397,885.09	+ 85,788.76
Other Paylist Items.....	1,990.24	1,637.65	+ 352.59
Printing and Stationery.....	15,812.04	15,111.87	+ 700.17
Travelling Expenses.....	65,898.08	58,639.65	+ 7,258.43
Sundries.....	221,262.60	191,088.73	+ 30,173.87
	\$ 788,636.81	\$ 664,362.99	+\$124,273.82
<b>International Fisheries Commission (Halibut)—</b>			
Salaries and Wages.....	20,069.42	18,891.55	+ 1,177.87
Printing and Stationery.....	697.01	799.46	— 102.45
Travelling Expenses.....	2,558.61	1,348.43	+ 1,210.18
Sundries.....	5,192.12	4,735.66	+ 456.46
	\$ 28,517.16	\$ 25,775.10	+ 2,742.06
<b>International Pacific Salmon Fisheries Commission—</b>			
Salaries and Wages.....	38,397.01	25,733.66	+ 12,663.35
Printing and Stationery.....	1,416.87	641.52	+ 775.35
Travelling Expenses.....	4,468.47	3,677.23	+ 791.24
Sundries.....	47,058.80	8,990.83	+ 38,067.97
	\$ 91,341.15	\$ 39,043.24	+\$ 52,297.91



Description	Expenditure 1947-48	Expenditure 1946-47	Increase or Decrease
<b>Fisheries Prices Support Act</b>			
Administrative Expenses—			
Salaries and Wages.....	\$ 15,414.31		+\$ 15,414.31
Other Paylist Items.....	38.57		+ 38.57
Allowances.....	4,400.00		+ 4,400.00
Printing and Stationery.....	2,027.93		+ 2,027.93
Travelling Expenses.....	12,106.08		+ 12,106.08
Sundries.....	349.65		+ 349.65
	\$ 34,336.54		+\$ 34,336.54
<b>Salt Fish Export Regulations—</b>			
Administration—			
Salaries and Wages.....	8,471.64	10,425.39	— 1,953.75
Other Paylist Items.....	28.08	28.85	— .77
Printing and Stationery.....	365.61	262.88	+ 102.73
Travelling Expenses.....	1,536.51	3,114.45	— 1,577.94
Miscellaneous.....	856.70	2,397.96	+ 1,541.26
	\$ 11,258.54	\$ 16,229.53	—\$ 4,790.99

(See page 98 for Fisheries Inspection)

## EAST PATROL SERVICE

	Permanent Salaries	Temporary Salaries	Other Expenditure	Totals
<b>NOVA SCOTIA—</b>				
C.G.S. Andrew Halkett.....	\$ 1,200.00	\$ 3,194.02	\$ 3,089.58	\$ 7,483.60
C.G.S. Capelin.....	2,400.00	5,060.58	2,216.74	9,677.32
C.G.S. Gilbert.....	2,400.00	3,621.97	637.86	6,659.83
C.G.S. Venning.....	1,200.00	1,719.24	5,543.11	8,462.35
Chartered Boats.....		997.50	3,352.09	4,349.59
General Account.....			101.47	101.47
<b>PRINCE EDWARD ISLAND—</b>				
C.G.S. Capital.....		2,006.54	1,413.05	3,419.59
Lobster Patrol Boat.....		357.10	4,256.09	4,613.19
Chartered Boats.....		3,720.34	4,664.58	8,384.92
<b>NEW BRUNSWICK—</b>				
Gannet Rock II.....	4,140.00		1,821.81	5,961.81
Fundy Rover.....	4,500.00	3,168.00	5,649.57	13,317.57
Straits Rover.....		1,829.71	1,451.86	3,281.57
Chartered Boats.....		8,932.12	10,077.93	19,010.05
General Account.....			116.23	116.23
<b>EAST—General Account.....</b>			326.97	326.97
	\$ 15,840.00	\$ 34,607.12	\$ 44,718.94	\$ 95,166.06

## EAST—PROTECTION SERVICE

	Permanent Salaries	Temporary Assistance	Allowances	Other Expenditure	Totals
C.G.S. Cygnus.....	\$ 7,781.90	\$ 38,545.07	\$ 9,020.89	\$ 50,021.14	\$105,369.00

## DEPARTMENT OF FISHERIES

FISHERIES INSPECTION, INCLUDING FISHERY OFFICERS AND GUARDIANS, FISHERIES PATROL AND PROTECTION SERVICE  
DISTRIBUTION OF EXPENDITURE BY DIVISION AND ESTABLISHMENT  
EAST—ADMINISTRATION

	INSPECTORS			GUARDIANS			Mis- cellaneous Adminis- trative Expenses	GENERAL			Totals
	Permanent Salaries	Temporary Assistance	Other Expenditure	Temporary Assistance	Other Expenditure			Permanent Salaries	Temporary Assistance	Other Expenditure	
	\$	cts.	\$	\$	cts.	\$	cts.	\$	cts.	\$	cts.
<b>NOVA SCOTIA—</b>											
Inverness-Victoria.....	12,651.00	8,973.45	8,816.04	16,276.00	901.38	50.00					\$
Richmond-Cape Breton.....	14,858.30	7,814.20	8,747.40	4,653.21	46.14	26.00					47,667.87
Cumberland-Colchester and Hants.....	11,376.00	8,163.04	7,775.00	8,990.25	975.40	389.33					36,145.25
Pictou-Antigonish and Guysborough.....	9,165.00	12,234.35	7,129.32	7,097.61	594.07	222.28					38,269.02
Halifax.....	6,408.87	11,592.10	6,658.20	2,813.31	260.11	112.74					36,442.63
Linenburg-Queens.....	3,595.00	9,888.20	6,667.93	14,320.32	1,127.45	58.00					37,845.33
Shelburne-Yarmouth.....	3,810.00	12,583.22	6,413.82	4,918.38	830.61	17.85					37,857.10
Digby-Annapolis and Kings.....	6,951.00	6,739.80	8,805.52	3,692.20	37.47			6,645.00	1,487.65	8,315.27	28,575.88
General.....											26,225.99
											16,447.92
<b>PRINCE EDWARD ISLAND—</b>											
Prince.....	10,674.00	5,980.70	7,444.50	9,360.60	1,074.20	358.43					34,892.43
Queens.....	5,835.00	7,461.13	5,178.52	3,348.13	1,637.64	63.40					23,323.22
King s.....		92.71	781.23		38.37	204.00		5,751.00	192.48	3,101.25	1,137.31
General.....											9,044.73
<b>NEW BRUNSWICK—</b>											
Restigouche-Gloucester.....	9,466.00	17,068.21	9,937.07	6,176.56	1,199.89	188.44					44,036.27
Northumberland.....	14,557.86	13,499.78	12,382.32	18,606.62	1,367.12	760.79					59,581.29
King-Arthur and Westmoreland.....	6,624.00	13,624.00	8,101.53	10,315.50	1,065.56	150.87					39,757.29
St. John-Charlotte.....	8,706.00	8,625.30	7,617.27	5,031.40	301.82	44.60					30,326.30
Kings-Queens-Sunbury, York and Carleton.....	5,277.00	8,260.90	5,473.39	20,040.70	718.39	171.50		4,365.00	4,823.23	7,395.58	39,941.88
General.....											16,583.81
<b>QUEBEC—</b>											
General.....											
East-General Account.....								18,021.00	8,562.83	1,034.14	1,034.14
Fish Curing Inspection Service.....									6,908.00	25,081.75	51,665.58
Canned Fish Inspection Laboratory.....									48,583.96	4,666.84	11,574.84
										25,951.52	74,535.43
	132,555.03	150,885.78	117,929.06	135,840.99	12,196.02	2,798.23		34,782.00	70,558.15	75,546.35	733,091.61

(See page 100 for—West - Administration)

## WEST PATROL SERVICE

	Permanent Salaries	Temporary Assistance	Other Expenditure	Totals
<i>District No. 1—</i>				
C.G.S. Humming Bird			\$ 2.07	\$ 2.07
C.G.S. Swan-Tail No. 2	\$ 2,400.00	\$ 3,540.00	1,774.04	7,714.04
C.G.S. Vedder River	4,380.00	1,560.00	496.92	6,436.92
F.D. 101	4,367.00	1,560.00	1,554.34	7,481.34
F.D. 102	13.00	3,960.97	1,488.65	5,462.62
Arrow Post	4,560.00	3,370.00	3,640.27	11,570.27
F.P.L. Babine Post			9.10	9.10
Nelson Post			100.73	100.73
Comox Post			10.58	10.58
General Account			427.63	427.63
<i>District No. 2—</i>				
C.G.S. Babine No. 1		800.00	240.88	1,040.88
C.G.S. Babine No. 2		763.87	264.45	1,028.32
C.G.S. Beldis		3,029.79	2,577.39	5,607.18
C.G.S. Bonila Rock No. 2		2,203.39	1,893.48	4,096.87
C.G.S. Clupea	3,948.42	1,594.02	3,550.51	9,092.95
C.G.S. Onerka No. 2	431.58	3,306.74	1,279.19	5,017.51
P.L. Minktrap Bay		512.00	28.04	540.04
F.D. 201		1,804.32	766.75	2,571.07
F.D. 202	3.87	1,359.06	1,368.12	2,731.05
F.P.L. Sooke Post		7,865.92	5,647.14	13,513.06
F.P.L. Babine Post	1,836.00	4,915.00	5,308.82	12,059.82
F.P.L. Nicola Post	324.00	9,355.18	9,340.09	19,019.27
Chilco Post	199.87	5,738.15	9,443.41	15,381.43
Chartered Boats		28,414.91	30,099.66	58,514.57
General Account			1,372.97	1,372.97
<i>District No. 3—</i>				
C.G.S. Black Raven No. 2		5,223.59	1,702.97	6,926.56
C.G.S. Egret Plume No. 2		5,470.97	1,494.37	6,965.34
C.G.S. Pursepa		4,867.20	1,826.76	6,693.96
F.P.L. Stuart Post	1,646.67	3,658.91	4,848.78	10,154.36
F.P.L. Atlin Post		8,664.78	8,156.12	16,820.90
Merry Sea 2		938.55	120.58	1,059.13
F.D. 202	400.00	330.00	119.09	849.09
Comox Post	1,097.33	2,835.26	25,917.39	29,849.98
Chartered Boats		33,302.22	26,112.10	59,414.32
General Account			15,097.30	15,097.30
Small Boats				
Digby Island	2,406.26	2,110.50	1,454.44	5,971.20
Poplar Island	2,700.00	17,435.87	4,060.96	24,196.83
General				
<i>Air Services—</i>				
District No. 2			4,949.99	4,949.99
District No. 3			3,465.00	3,465.00
	\$ 30,714.00	\$170,491.17	\$182,011.08	\$383,216.25

## WEST PROTECTION SERVICE

	Permanent Salaries	Temporary Assistance	Other Expenditure	Totals
C.G.S. Nitinat	\$ 3,162.67	\$ 4,655.92	\$ 6,723.45	\$ 14,542.04
C.G.S. Kitimat	6,868.09	12,326.64	17,009.34	36,204.07
Laurier	6,505.79	18,793.17	48,041.37	73,340.33
Howay	7,560.03	10,276.12	54,768.07	72,604.22
	\$ 24,096.58	\$ 46,051.85	\$126,542.23	\$196,690.66

## DEPARTMENT OF FISHERIES

## WEST — ADMINISTRATION

[illegible]



## PRAIRIE PROVINCES ADMINISTRATION

	Permanent Salaries	Temporary Assistance	Other Expenditure	Totals
Inspectors.....	\$ 1,980.00	\$ 780.00	\$ 1,345.95	\$ 4,105.95
Guardians.....			6,637.93	6,637.93
Miscellaneous Administrative: Expenses.....			501.37	501.37
General Account.....		8,498.20	6,985.79	15,483.99
	\$ 1,980.00	\$ 9,278.20	\$ 15,471.04	\$ 26,729.24

(See page 100 for Summary)

FISHERIES RESEARCH BOARD OF CANADA  
(OPERATION AND MAINTENANCE)  
EXPENDITURE 1947-48

	From Vote	From Receipts	Total
Atlantic Biological Station—St. Andrews, N.B.	\$205,355.85		\$205,355.85
Atlantic Experimental Station—Halifax, N.S.	98,976.43		98,976.43
Gaspe Experimental Station—Grand River, P.Q.	71,400.51		71,400.51
Herring Investigation, Atlantic	12,000.00		12,000.00
Central Fisheries Research Station	24,441.68		24,441.68
Pacific Biological Station—Nanaimo, B.C.	225,703.31	\$ 8,140.63	233,843.94
Pacific Experimental Station—Vancouver, B.C.	86,264.79		86,264.79
North West Territories Investigation	10,964.84		10,964.84
Marine Survey, Eastern Arctic	12,806.00		12,806.00
General:			
A. G. Huntsman.....	20,584.43		20,584.43
Administration.....	20,138.97		20,138.97
	\$788,636.81	\$ 8,140.63	\$796,777.44

## PRIBILOF SEALING

## STATEMENT OF REVENUE AND EXPENDITURE 1947-48

## Receipts from Sales:

April and May	2,055 skins	\$100,985.00
June	5,047 skins	190,906.50
September	3,000 skins	118,257.00
November	5,066 skins	328,271.70
December	32 skins	888.19
March	1,903 skins	87,604.00

Balance of Canada's share of sale of 1943 catch..... \$826,912.39

Total Receipts..... \$893,362.70

*Expenditures:*

Fouke Fur Co., St. Louis:			
Dressing and dyeing.....	\$129,864.60		
Cases and packing.....	266.32		
Freight to Montreal.....	510.45		
Blubbering of 3,687 skins.....	2,136.40		
			\$132,777.77
C. W. Martin & Son, London:			
Dressing and dyeing.....	\$100,790.98		
Cases and packing.....	314.70		
Freight to Montreal.....	807.83		
			\$101,913.51
Canadian National Railways:			
Freight, 3,687 skins, Seattle to Montreal.....			1,082.70
Canadian Pacific Railway Co.:			
Freight, 3,687 skins, Montreal to London.....			1,052.60
A. W. Kyle & Co., Montreal:			
Customs Brokerage Fees.....	\$ 191.65		
Freight from London.....	399.77		
			\$ 591.42
F. A. Harrison, Ottawa:			
Travel expenses to Montreal..			248.55
Canadian Fur Auction Sales Co.:			
Commission on sales.....			28,910.87
Collector of Customs, Montreal:			
Duty and Taxes on 14,020 skins.....			\$149,756.28
U.S. Government:			
141 Barrels.....			637.14
Canadian share of expenses of auction sale during 1946 of 1943 seal skins (Revenue received during 1946-47, \$189,131.46 and 1947-48, \$66,450.31).....			53,014.92
			<u>\$469,985.76</u>

## DISPOSAL OF SEAL SKINS 1947-48

April 1, 1947—Skins on hand:			
C. W. Martin & Son.....	1945 Catch.....	8,962	
	1946 Catch.....	3,230	
			12,192
Fouke Fur Co. ....	1946 Catch.....		9,675
			<u>21,867</u>
Sales during 1946-47:			
C. W. Martin & Son.....	1945 Catch.....	8,962	
Fouke Fur Co.....	1946 Catch.....	8,141	17,103
			<u>4,764</u>
1947 Catch:			
C. W. Martin & Son.....		3,687	
Fouke Fur Co.....		8,602	12,289
			<u>17,053</u>
Balance on hand March 31, 1948			
			<u>17,053</u>
Balance on hand March 31, 1948:			
C. W. Martin & Son.....	1946 Catch.....	3,230	
	1947 Catch..	3,687	
			6,917
Fouke Fur Co.....	1946 Catch.....	1,534	
	1947 Catch.....	8,602	
			<u>10,136</u>
			<u>17,053</u>

DIVISIBLE EXPENDITURES AND RECEIPTS  
1947-48*Pacific Halibut Treaty*

Gross Expenditures	Canada's Share	United States' Share	Receipts from United States Government	Balance due from United States Government
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
56,762.32	28,517.16	28,245.16	22,487.34	5,757.82

*Pacific Salmon Treaty*

Gross Expenditures	Canada's Share	United States' Share	Receipts from United States Government	Balance due from United States Government
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
182,489.90	91,341.15	91,148.75	45,597.03	45,551.72

*Pacific Salmon Treaty (Hell's Gate)*

Gross Expenditures	Canada's Share	United States' Share	Receipts from United States Government	Balance due from United States Government
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
253,944.27*	126,972.14*	126,972.13	96,852.65	30,119.48

- \* Includes (1) Refund of \$204.50 credited to Revenue—Previous Years' Expenditure.  
(2) Expenditure of \$261.71 made by Dept. of Transport.

(See page 104 for Expenditure by Provinces)

STATEMENT SHOWING THE ANNUAL EXPENDITURE OF THE DOMINION  
GOVERNMENT ON ACCOUNT OF FISHERIES SERVICE SINCE CONFEDERATION

Year	Fish Inspection, etc.	Fish Culture	Fisheries Research Board	Development of Deep Sea Fisheries, etc.	Fishing Bounty	Fisheries Prices Support Board	Sundry Services	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
To 1946-47.....	40,533,752.02	12,511,117.50	6,198,831.71	2,533,735.04	10,306,012.27	77,837,520.01	149,920,968.55	
1947-48.....	1,812,802.93	277,944.16	821,986.88	30,414.06	159,992.75	34,336.54	1,177,488.09	4,314,966.01
Total.	42,346,554.95	12,789,061.66	7,020,818.59	2,564,149.10	10,466,005.02	34,336.54	79,015,008.70	153,235,934.56

## DEPARTMENT OF FISHERIES

## EXPENDITURE BY PROVINCES 1947-48

Appropriation	General	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	North-west Territories	Yukon Territory	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Miscellaneous Civil Service Gratuities	390.00												390.00
Minister's Salary and Motor Car Allowance	11,289.25												11,289.25
Departmental Administration	197,856.25												197,856.25
Fisheries Inspection, etc.		435,980.18	135,993.57	360,618.78	1,084.14		26,729.24			852,417.42	4.69	24.91	1,812,802.93
Building Highways and Clearing Rivers	96	6,124.78		647.12						1,562.43			8,335.29
Educational Extension Service	22,751.41	4,735.93				2,432.56	2.50			491.66			30,414.06
Fish Culture	14,426.63	135,024.23	9,958.06	118,065.32									277,594.16
Oyster Culture	133.80	9,489.93	21,170.82	2,321.53									33,572.40
Fisheries Research Board of Canada:													
Operation and Maintenance	66,866.20	100,412.10	10,280.96	179,356.84	71,400.51		24,441.68			312,107.68	23,770.84		788,636.81
Construction and Improvements					33,204.41					145.68			33,350.07
International Fisheries Commission (Halibut)										28,517.19			28,517.16
International Pacific Salmon Fisheries Commission										91,341.15			91,341.15
International Pacific Salmon Fisheries Commission (Hell's Gate)										126,914.93			126,914.93
Grant to United Maritime Fishermen's Association		1,000.00	1,000.00	1,000.00									3,000.00
Expenses re: Pelagic Seal Skins	469,985.75												469,985.75
Destruction of Harbour Seals		5,935.00	995.00	2,685.00						13,205.00			22,820.00
Fishing Bounty		84,565.50	12,286.45	21,369.75	41,771.05								159,992.75
Extension of educational work in co-operative producing and selling among fishermen		21,290.67	4,096.12	8,990.87	24,000.00					7,161.50			65,539.16
Administrative Expenses, Fisheries Prices													
Support Act 1944	18,715.31	1,626.66	221.30	2,148.14	1,447.09	815.33	560.87	145.05	750.10	7,893.94	12.75		34,336.54
Assistance in construction of vessels of the dragger and/or long liner type				40,504.20									40,504.20
Construction of vessel for experimental fishing for herring and mackerel	8,908.72												8,908.72
Demobilization and Reconversion:													
Salt Fish Export Regulations (Admin.)	3,223.77				1,247.25								11,258.54
Assistance in construction of dragger type and conversion of fishing schooners to draggers	57,255.84												57,255.84
	871,673.94	814,022.51	196,008.28	737,707.78	174,104.45	3,247.89	51,734.29	145.05	750.10	1,441,758.53	23,788.28	24.91	4,314,966.01



*Department of Fisheries*STATEMENT SHOWING THE EXPENDITURE OF THE DOMINION GOVERNMENT  
ON ACCOUNT OF FISHERIES SINCE CONFEDERATION

## SUMMARY BY PROVINCES

General .....	\$ 9,247,375.02
Nova Scotia .....	28,969,722.29
Prince Edward Island .....	4,512,933.65
New Brunswick .....	13,919,404.42
Quebec .....	9,113,445.65
Ontario .....	4,218,617.13
Manitoba .....	1,944,888.97
Manitoba and Northwest Territories .....	24,771.76
Saskatchewan .....	580,231.20
Alberta .....	642,439.80
British Columbia .....	80,864,773.21
Northwest Territories .....	164,656.87
Yukon .....	32,674.59
Total .....	<u>\$154,235,934.56</u>

*Department of Fisheries*STATEMENT SHOWING THE REVENUE COLLECTED ANNUALLY BY THE  
DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE  
SINCE CONFEDERATION

Year	Fisheries Revenue and Fines and Forfeitures	Casual Revenue	Pelagic Sealing Revenue	Sundry Revenue	Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
To 1946-47 .....	6,269,883.25	311,087.94	4,769,278.41	5,235,566.59	16,585,756.19
1947-48 .....	101,431.26	12,893.22	893,362.70	5,006.90	1,012,694.08
Total .....	6,371,314.51	323,981.16	5,662,641.11	5,240,513.49	17,598,450.27

STATEMENT SHOWING REVENUE COLLECTED BY THE DOMINION  
GOVERNMENT ON ACCOUNT OF FISHERIES SERVICE SINCE  
CONFEDERATION

## SUMMARY BY PROVINCES

General .....	\$10,515,911.08
Nova Scotia .....	922,963.27
Prince Edward Island .....	237,442.38
New Brunswick .....	788,949.90
Quebec .....	359,758.46
Ontario .....	561,205.84
Manitoba .....	336,000.67
Manitoba and Northwest Territories .....	7,416.45
Hudson Bay District .....	1,192.88
Saskatchewan .....	95,152.41
Alberta .....	234,710.87
British Columbia .....	3,504,251.53
Northwest Territories .....	12,842.78
Yukon Territory .....	20,651.75
Total .....	<u>\$17,598,450.27</u>

## REPORT OF THE FISHERIES RESEARCH BOARD OF CANADA FOR THE YEAR 1947

BY THE CHAIRMAN, G. B. REED

The parent organization of the Fisheries Research Board, the Biological Board, was organized half a century ago to promote through scientific research the interests of Canadian fisheries and world food supply. The work was started in a small way and has gradually developed through the achievement of a wide range of investigations carried to successful conclusions.

The Fisheries Research Board as now constituted includes fifteen members (there is one vacancy) appointed by the Minister of Fisheries for five-year terms. Nine members are scientists from the staffs of Canadian universities, two are from the Fisheries Department, and four members represent the fishing industry. During the year the Board lost two members: Dr. A. T. Cameron, died in September after eighteen years a member and thirteen years as Chairman; Mr. W. J. H. Deane was forced by ill health to retire after several years of highly valued membership. Their places have been filled by appointment of Professor I. M. Fraser of the University of Saskatchewan and Mr. K. F. Harding of Prince Rupert, B.C.

The Fisheries Research Board is an honorary administrative body. The Board meets once per year as a unit for the consideration of work in progress and the development of policy. At the Annual Meeting officers are elected and charged with administration of the Board's research and other activities: chairman, vice-chairman, secretary and honorary treasurer; an executive committee consisting of the officers and four other members; an Atlantic subexecutive; a Gaspé subexecutive and a Pacific subexecutive.

During the first twenty-five or thirty years of its existence the greater part of the investigational work carried out under the Board was done by university scientists as summer work. This was a period of active exploration of marine biology and related subjects. Application to Fisheries problems was often remote. During the last twenty years full-time staffs of biologists, oceanographers, chemists, biochemists, bacteriologists and engineers have been employed and provided with the facilities for a greatly expanded programme of work. The world food situation stimulated a marked enlargement of the Board's budget in 1942 and permitted the undertaking of long term projects, projects which are beginning to come to fruition.

Three general types of work are carried out; biological and oceanographic, technological and explorative. Biological work is centred in three stations, the Atlantic Biological Station, St. Andrews, N.B., the Pacific Biological Station at Nanaimo, B.C. and the Central Fisheries Station at Winnipeg. For the technological work three stations are maintained, the Atlantic Fisheries Experimental Station at Halifax, the Pacific Fisheries Experimental Station at Vancouver and the Gaspé Fisheries Experimental Station at Grande Rivière, Qué. Areas of exploration vary from year to year; this year, work was limited to the northwest and to the eastern Arctic. These research organizations are in charge of highly competent directors with staffs of well trained scientists and technologists.

The investigations carried out in any one year ordinarily consist of short term studies often completed in the year and a series of studies which from the nature of the work, especially studies concerned with the biology of fish in the sea or conditions of the sea in which they live, are continued for a number of years.

The following paragraphs call attention to the more important work carried out during the year. Further details of these and other studies may be found in the appendices and, in the case of work which has progressed to that stage, reference may be found to published papers in Appendix X.

### 1. *Biological work on the Atlantic, St. Andrews Station*

Some eight major investigations and several minor studies are in progress in Atlantic waters.

*Lobsters.* The most important inshore fishery of the Atlantic has been studied intermittently for a number of years. Since 1942 a much more intensive investigation has been carried out designed to develop the means of maintaining and increasing stocks of lobsters. Basic information has been accumulated on life history, mating, egg laying, larval growth and distribution, adult growth, moulting and distribution. This information, together with full knowledge of populations in relation with fishing intensity, for the first time gives us a reasonably complete picture of the conditions of stocks, the manner of their growth under natural conditions, the extent to which they are being exploited and provides a basis for intelligent conservation and exploitation.

*Oysters.* Increasing knowledge of Atlantic oysters has made possible the rehabilitation of an industry seriously depleted by an oyster disease. Spread of this disease in Malpeque bay was followed by the development of a disease resistant strain, and the utilization of this strain in re-establishing more recently affected areas has been highly successful. Study of the starfish, the most serious oyster predator, has led to techniques of rearing small oysters safe from this danger. Much accumulated information on larval life, spat prediction and collection, growth and development forms the basis for the establishment of oyster farming on an increasing scale. Surveys of actual and potential producing areas and detailed studies of growth conditions are improving this knowledge and contributing to an expanding industry.

*Soft-shelled clams.* Progress has been made during the year in the development of clam farming and in the improvement of clam producing areas. It has been shown in extensive surveys that there are many areas where growth is poor but reproduction good, and areas where natural seeding is poor but growth conditions are satisfactory. Farming the latter areas with seed from the former is proving highly successful. Much detailed information is becoming available on planting techniques, growth rates, control of clam drills, methods of digging and many other factors essential to the development of this important industry.

*Smelts.* This Atlantic fishery, centred in the Miramichi estuary, is a very intense fishery with a declining production. A detailed study has indicated that both the fishing and spawning conditions are subject to control. It has been shown that the most important factor in larval production is relatively low cost stream clearance to prevent crowding of eggs below obstructions. This is now being carried out.

The present fishery takes at least two-thirds of the fish entering the estuary during the fishery season. However, the spawning run is made up both of the fish not taken during the fishing season and by fish which later enter the estuary. These data are now being used to determine the proportion of the total population taken in the fishery and to develop a more efficient exploitation policy.

*Ground fish.* Cod, haddock and flatfish constitute the most important Canadian Atlantic fishery considering both inshore and offshore fishing. Much of this fishery is in international waters. It is of the greatest importance to recognize overfishing, if it occurs, and to increase the effectiveness of fishing effort through improved knowledge of fish stocks and improved fishing methods. A long term study directed toward these aims is now in progress. Catch statistics are being collected on both offshore and inshore fisheries in relation with age classes, growth rates and local division of populations. Eventually this will indicate the extent to which the stocks are increasing or decreasing.

Much new and valuable information has been accumulated on life histories and distribution of the three most important species of flatfish, the yellowtail flounder, winter flounder and Canadian plaice. An investigation of the halibut in northern gulf of St. Lawrence waters indicates that these fish are much more abundant than previously supposed to be the case. It is shown that the fishing season may be lengthened and the catch markedly increased by extending fishing to deeper waters.



An important advance has been made toward a solution of the serious cod worm infestation problem by demonstrating that a stage of the parasite occurs in the harbour seal. If further work indicates that this stage of the worm is restricted to the seal a possible mode of attack will be available.

*Brook trout.* Extensive surveys of trout production have shown wide differences in different waters. In one series of lakes the production was less than a pound per acre. Introduction of hatchery stock had little influence. This is in sharp contrast to the high productivity of ponds and streams in other areas which yielded up to sixty pounds per acre. Experiments in the large scale fertilization of ponds, producing low yields of trout under natural conditions, is now in progress.

## 2. *Atlantic Herring Investigation Committee.*

This Committee is sponsored by the Governments of Canada and Newfoundland and the provincial governments of Quebec, Nova Scotia, New Brunswick, and Prince Edward Island. Laboratory space and the base for operations are provided by the St. Andrews Station. Dr. Needler, director of the Station, is alternate Chairman with major administrative responsibilities, and Dr. A. H. Leim of the Station staff is Investigator-in-charge.

During the year exploration with sonic sounders and purse seines in the gulf of St. Lawrence and on the outer coast of Nova Scotia has failed to reveal any concentrations of herring in offshore waters during spring, summer and autumn. Extensive schools have been found in the bay of Fundy and in the bay of Islands, Newfoundland, in winter. Hydrographic studies, carried out in conjunction with the herring work, have greatly increased our knowledge of conditions in the gulf area.

## 3. *Atlantic Salmon Investigation.*

Dr. Huntsman's study of salmon and Atlantic salmon rivers, which has been in progress for some years, has resulted in the accumulation of a large body of knowledge of these important subjects. Many papers have been published and a great accumulation of data awaits integration and publication. Growing out of these studies are principles for the management of rivers with the object of both increasing productivity and assuring salmon for angling. The government of Nova Scotia, with some cooperation from the Board, has in progress the application of certain of these principles in a management programme for the La Have river.

At a meeting of the River Management Committee it was shown that the Grand lake system provides a good opportunity to further test the influence of artificial freshets to bring salmon into a river.

## 4. *Atlantic Fisheries Experimental Station.*

Four major studies are in progress or have recently been completed.

*Quality control of fresh and frozen fish.* A long and detailed study has established that deterioration in quality of fresh fish to frank spoilage results from bacterial action. The bacteria come primarily from the slime of the fish. Of the many types of bacteria in the slime certain species are primarily concerned in the spoilage. Early stages of deterioration may be determined by quantitative measure of trimethylamine. It is also shown that there are several critical stages in the handling, particularly in the hold of the ship and on the cutting table. These critical stages are subject to control and efficient measures have been worked out or are well advanced. Finally, detailed methods of determining quality have been developed and exhaustively tested on large volumes of fish shipped to Britain during the war years.

It now remains for industry and the Fisheries Department to make such use of these results as seems desirable.

*Salt fish drying.* As a result of approaching this ancient practice as a problem in physical chemistry and engineering, highly effective results have been obtained. Detailed knowledge of the nature of the process has led to the development of a



successful artificial dryer. These dryers have been widely adopted by the industry and a sufficient number have been put into operation to handle our entire Atlantic dried fish product. Fish drying has become a year-round process independent of the vagaries of weather, with an improvement in quality and uniformity at a lower cost than sun drying. Moreover, a study of storage conditions has made possible the elimination of the old heavy losses from *red* and *dun*. These results then have passed in a relatively short time from the laboratory to large scale utilization and have altered the whole face of an important industry. Little more work appears necessary for a considerable period.

*Fish smoking.* This almost equally ancient curing process has been shown to lend itself to detailed scientific analysis. As a result of a study of the colloidal chemistry of smoke and the mode of action of smoke on fish under controlled conditions successful smoke producers and a smoking tunnel have been engineered. These controlled smokers have been found under industrial use to produce a more uniform product of better quality and flavour at a lower cost than the old type smoke house. As a result the picturesque smoke house is disappearing.

*Fish oils.* Much work has been done on fish liver oils, particularly on methods of improving quality of vitamin oils. At present work is in progress on herring body oils and on seal oils (in cooperation with the Gaspé Station).

#### 5. *Gaspé Station.*

Two major studies are in progress.

*Gaspé cure.* The Gaspé coast has an established reputation for its light salted fish, the Gaspé cure. The methods long in use have resulted in very great lack of uniformity in the product. Details of the curing process have been studied for several years. It is now apparent that concentration of salt in the curing and the method of application of salt kench or wet curing, has a selective action on the types of bacteria active in the fish, particularly proteolytic forms and trimethylamine formers. As a result small changes in salt concentration have a marked effect on flavour and texture. Optimum conditions for drying the light salted fish in artificial dryers and optimum conditions for storage of the dry fish have been worked out. Good progress has therefore been made in the standardization of this important process.

*Seal Oil.* Large potential supplies of seal oil have made it important to work out methods of rendering and purifying the oil for industrial use. Chemical characteristics of the oil have been established and methods of bleaching and refining have progressed to a stage applicable to commercial operations. Much further work is, however, indicated.

#### 6. *Central Station.*

Two major problems have been in progress since this Station was established in 1944.

*Trienophorus infestation of whitefish.* Following the working out of the life history of this parasite and the locating of the adult stage in the jackfish (pike), an experiment has been tried on one lake to attack the problem by destruction of the jackfish. During the year some 80% of the jackfish have been removed from this lake with an estimated reduction of incidence of 70% in whitefish infestation. This type of work is being continued and expanded. If the results on a wider trial are equally successful the way will be open to make a frontal attack on this serious menace to fresh water fisheries.

*Life history of the goldeye.* Rapidly diminishing stocks of goldeye made necessary an investigation of the cause. The life history of the fish, spawning areas and general distribution have now been worked out and one of the causes of the depletion of stocks in lake Winnipeg has been shown to result from trapping the young fish in the autumn in the marshes and shallow lakes of the Saskatchewan delta by series of dams constructed for the benefit of muskrats. It is further shown that the young

fish can be flooded from these areas to deeper water by a judicious operation of the dams. The flooding operations have been put into effect. A marked improvement in supply is anticipated.

#### 7. *Northwest Surveys.*

During 1944 and 1945 the Board made an extensive survey of the fisheries resources of Yukon and Northwest territories. These studies indicated that of all the waters examined only Great Slave lake and possibly the lower McKenzie river contain large fish populations. As an outgrowth of these studies Great Slave lake was opened for commercial fishing in 1945 when one and a half million pounds of fish were taken. There have been larger amounts in succeeding years. Professor Rawson of the University of Saskatchewan has continued for a fourth year his study of the biology of the lake. This investigation has provided us with detailed knowledge of a northern lake, and the study of fish populations from the beginning of large scale fishing operations provides a unique opportunity of following the influence of commercial exploitation.

#### 8. *Pacific Biological Station.*

Four major studies are now in progress.

*Skeena River salmon investigation.* The fluctuating catch of salmon and the apparent overall decline in catch in waters stocked from the Skeena river led in 1944 to the initiation of an intensive investigation of this river system. Four of the proposed five years of study are now past. Until the full plan of work is completed it is impossible to estimate the final outcome.

There is now available more information concerning the salmon in the system than ever before and thus the general picture of the situation is fairly clear. The sockeye population has decreased owing to a number of factors, amongst which may be overfishing and poor hatching conditions. The pink salmon are unpredictable, probably owing to the fact that they are so susceptible to the effects of weather conditions. The springs, cohos and chums have maintained themselves or even bettered their conditions. Access to spawning grounds is fairly easy except in the case of one or two major obstructions such as Moricetown falls. The spawning rivers are in the main suitable but might be improved by judicious manipulation of jams and channels. In the main the lakes (the nursery areas) show no conditions which would limit production of salmon. Fish predators, although most plentiful in the coastal areas, are not present anywhere in extreme numbers. The effect of seals has been demonstrated. The fishery takes the runs to most rivers throughout the season but some, such as those to Lakelse lake and the Gitnadoix, come in early and are little exploited.

A year from now we shall have a full report on this important salmon nursery on which it is anticipated we will be able to base a more efficient exploitation policy.

*General salmon investigation.* In 1945 an intensive study was undertaken of the salmon breeding grounds between the Fraser and Skeena rivers. The investigation to date has been mainly devoted to studies of pink and chum salmon, these species being selected because of their increasing commercial importance and the marked fluctuations which they exhibit in respect to the size of the annual runs. The very low availability of chum salmon in 1944 was an immediate cause of concern.

The general results to date have indicated (a) a very low efficiency of chum salmon reproduction in the streams of the east coast of Vancouver island, (b) the great importance of stream-flow conditions in determining the production of salmon, (c) the reasonable possibility of effective artificial remedial measures in increasing the output of young salmon in certain areas, and (d) the possibility of making useful predictions regarding the size of future runs.

*Herring investigation.* This investigation has been in operation since 1929 and in a more intensive form since 1942.



Over the period of investigation there has been a steady accumulation of knowledge (1) of the life history of the herring, (2) of the various populations which are present, their migrations and extent of intermixture, (3) of the natural fluctuations in abundance which take place and the influence of these on the catch, (4) of the spawning grounds frequented by the various populations and variation in the size of the spawning runs, and (5) of the effect of fishing on the magnitude, size and age composition of the populations.

This information has been used by the Department of Fisheries to set up a management policy (quota system). The biological information has also enabled predictions of the size of the fish and of the abundance of the runs to be made of each population in advance of the fishing season. To the herring fisherman, an important achievement of the investigation has been the introduction of the echo sounder for locating schools of herring. This instrument has been of such value as to be now considered essential for successful competitive operation.

*Trawl investigation.* Trawl fisheries came into prominence only during the war years. An investigation was started in 1943 with very little previous knowledge on which to plan the study. The investigation has now defined the species supporting the fishery and assessed their relative importance on different fishing grounds and in various seasons of the year. Significant information has been collected concerning the various populations of fish and their general biology. The life history and fishery situation of the lemon sole have been worked out in some detail. Critical information on the life history of the dogfish has been confirmed and the conclusions published; the changes in abundance of dogfish on the west coast of Vancouver island and in Hecate strait have been investigated with the result that a marked decline was shown in the latter but not in the former.

#### 9. *Eastern Arctic Investigation.*

Aside from a limited number of reconnaissance surveys fisheries resources of the Canadian Arctic have received scant attention. The matter is of importance both from the point of view of food supply for local populations and the filling of a serious gap in our knowledge of fisheries potentialities. During the past summer Dr. M. J. Dunbar of the Department of Zoology, McGill University, made a reconnaissance survey of Ungava bay for the Board. This survey opens up important problems concerning cod, seals, walrus, sharks, prawns and other groups, their exploitation and conservation.

#### 10. *Pacific Fisheries Experimental Station.*

The work of the Station falls into seven or eight major long term problems and a series of short term investigations. The more important work of the year is as follows:

*Sanitation of vessels and fish plants.* Much work has been done over a number of years on the general sanitation of fishing vessels and plants, the use of steam guns, germicides and detergents. During the year a series of new anti-bacterial agents have been tested for these purposes and for the possible preservation of fish, including sulphonamides and antibiotics.

*Refrigeration.* Much has been done at this Station over the last ten years to improve low temperature storage of fish. During the year there have been several important developments. Additional work has been done on the insulation of fishing vessels and improvements made in the distribution of ice and fish. Attempts were made to supercool halibut before storage in the holds but without significant results.

Studies on the properties of insulating materials, the imperviousness of wall structures and the principles of "jacketed" rooms has led to important development in the construction of cold storage plants. Studies, in cooperation with the National Research Council, of full scale trials of refrigerator cars with bunker refrigerants of ammonium nitrate, salt and crushed ice have resulted in lower temperatures

than obtained with standard procedures, but the theoretical possibilities have not been realized. This relative failure has resulted in the construction of a model car and the initiation of work on a mechanical refrigeration unit with non-expendable refrigerant.

*Antioxidants.* One of the difficulties in any refrigeration procedure is the slowly developing oxidative rancidity of fats. A series of antioxidants have been shown to retard significantly this development of rancidity in the flesh of frozen salmon, herring and black cod. Ascorbic acid (vitamin C) seems to be the most desirable in view of its acceptability for use in food. Large scale trials made by dipping fillets in 1% ascorbic acid solution previous to freezing has proved to be highly successful.

*Smoking.* Successful smoking operations have been extended during the year to anchovies and to certain fresh water fish, mentioned later.

*Canning.* Canning trials have been extended to halibut and shrimps. A serious difficulty in canning shrimps has been solved by the prompt beheading of freshly caught animals. Problems in the canning of whitefish and other fresh water species have been minimized by suitable processing methods and the use of "sea food" enamel cans.

*Fish scrap recovery.* A considerable amount of wholesome fish flesh remains attached to trimmings and bones in filleting, steaking and canning operations. A very efficient machine has been developed which recovers most of the edible flesh in these wastes in a form suitable for fish sausage, loaves and pastes.

*Oils and vitamin oils.* Much pioneer work has been done at the Station on fish oils in general and vitamin oils in particular. In 1941 the Station published bulletin 59, "Chemistry and Technology of Marine Animal Oils." This was well received both in Canada and wherever fish oils are processed. So much has happened in this field since the bulletin was published, both at the Station and in many other laboratories, that a new edition is required. Much of the time of the Station staff during the year has been devoted to this rewriting.

*Processing fresh water fish.* During the year a member of the Station engineering staff made a detailed survey of fish handling and processing in the Prairie provinces. Later he and the director of the Station extended the survey to Ontario. Much advice and assistance was given on the construction and remodeling of cold storage plants, smoking plants and general handling problems. Experimental work was carried on at the Station on the canning of whitefish and other species and on smoking.

Work is now in progress on the design of small scale reduction plants suitable for the preparation of oil and meals from fresh water fish.

#### 11. *Joint Committee on Oceanography.*

The Committee organized in 1946 under the sponsorship of the National Research Council, the Naval Services and the Fisheries Board with Lt.-Col. H. B. Hachey of the St. Andrews Station staff as Chief Oceanographer, has made good progress during the year. Since similar data are required by the three organizations, the pooling of resources and effort very greatly increases effectiveness.

As noted in Appendix I an extensive oceanographic study was carried out in the gulf of St. Lawrence in connection with the herring investigation though the work has much wider significance. A project is under way on the Pacific.

The primary difficulty at the present time is the supply of trained oceanographers.

#### 12. *Advisory Committees.*

A number of advisory committees, sponsored by the Board, consisting of representatives of industry, fishermen and sports fishermen have been functioning on both coasts for some years. These committees have provided investigators with informed opinions, stimulated interest in the work and its application and in many



other ways have contributed to the Board's work. Advisory committees on the Margaree and the Skeena rivers and in the Gaspé region may be mentioned in particular. This year Mr. Walker organized a very active advisory committee on the Pacific general salmon investigation.

13. *Canadian Committee on Food Preservation.*

This committee, sponsored by the National Research Council, the Department of Agriculture and the Fisheries Research Board has continued to serve a useful purpose in pooling information. This has been particularly true in the field of refrigeration and transportation. At the annual meeting this year, held at the time of the annual meeting of the Board, a valuable programme of studies on fish preservation was presented by members of the scientific staff of the Board and of the Fish Inspection Service under the Chairmanship of Dr. S. A. Beatty of the Halifax Station.

14. *Food and Agriculture Organization of the United Nations.*

The Board has been represented at previous meetings of the F.A.O. This year Dr. D. G. Wilder of the St. Andrews Station attended the 3rd meeting at Geneva as a member of the Canadian delegation. A number of problems of importance to Canada were dealt with, particularly quality standards (see report of the Halifax Station on the subject) and the question of regional councils for the exploration of the sea.

15. *Board's property.*

Owing to enlargement of work and personnel, particularly since 1942, and to the small amount of building or major repairs during war years, the Board's laboratory space is utilized to the limits of capacity. In important instances the work is handicapped by lack of space and by the use of old buildings in which fire hazards are very great. The most urgent needs are at Nanaimo and St. Andrews. At Nanaimo the old wooden laboratory building was condemned and except for a small part has not been used for several years. During this time the work has been carried on in an entirely inadequate building. Plans were prepared and money voted two years ago for a new building but limitation of building materials has made it impossible to begin the work. At the time of writing there are good prospects that the work will be started early in 1948. Much study has been given to planning the building as a marine biological laboratory. It is anticipated that when completed the needs of the Station will be well covered for a number of years.

At St. Andrews the laboratory building was outgrown several years ago and important phases of the work are being carried on in an old wooden building highly unsuitable for efficient work and valuable material is exposed to a serious fire hazard. An extension of the main laboratory building, long overdue, must be considered immediately.

The Central Station is temporarily housed in a Winnipeg office building. This has been adequate for the work so far carried on but there are serious limitations and it will be necessary to make more permanent arrangements in the near future.

The Halifax, Vancouver and Gaspé Stations are now adequately housed but all are rapidly becoming overcrowded. However, their requirements are less urgent than the other stations and consideration of enlargements may be delayed until building conditions considerably improve.

## SUMMARY REPORT OF THE INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION FOR THE YEAR 1947

Authority for international control of the valuable sockeye salmon fishery of the Fraser River system is given by treaty between Canada and the United States ratified on July 28, 1937. The eight years of preliminary investigations prescribed in the Protocol of the Convention and two years of regulation by the Commission have passed. Fishways have been constructed so that the loss of fish which occurred annually at Hell's Gate, Bridge River Rapids, and at other major obstructions has been eliminated. Now the Commission is faced with the problem of rebuilding the runs of sockeye salmon and accordingly has paid particular attention to regulations which would give adequate protection for those runs of salmon that have been so seriously depleted.

On April 4, after considering proposals of its staff and of its Advisory Committee, the Commission promulgated the regulations for 1947 which in summary were as follows:

(a) The United States fishery and the Canadian fishery to the south of Vancouver Island opened on August 18.

(b) The Canadian fishery in the Fraser River and the Gulf of Georgia opened on September 8.

(c) The Canadian fishery observed a 72 hour weekly closure, while for the United States fishery the 36 hour weekly closure was retained.

(d) Between June 30 and the opening of the sockeye fishery, no one was allowed to take any kind of salmon with a gill net of less than 8 inches extension mesh.

Statistics of the 1947 catch show that a total of 441,158 sockeye was taken by the commercial fishery in treaty waters. The United States catch amounted to 88,219 fish or 36% of their 1943 catch. Canada, on the other hand, took 353,939 sockeye or even slightly more than the number landed in the brood year.

The 1947 escapement of sockeye to the spawning grounds was significantly larger than that reported in 1943. Particularly important were the numbers of fish found in the "up-river" runs which in previous years had been so seriously damaged by blockade conditions at Hell's Gate. The following table shows that the earlier runs which passed upstream before the start of the commercial fishery were from two to six times the size of the spawning populations in their brood year.

Stream	NUMBER OF SOCKEYE		Percentage 1947-1943
	1943	1947	
Raft River.....	4,000	8,000	200
Chilko River.....	14,000	55,000	395
Stellako River.....	9,000	55,000	610
Stuart Lake.....	3,000	14,000	466
Bowron River.....	6,215	23,945	385
	36,215	155,945	431

Even though the later run of sockeye bound for the South Thompson area was subjected to a moderately intense fishery, a total of 204,000 sockeye reached the spawning grounds, considerably more than were present in 1943.

Proportionate to the greater escapement to the spawning grounds, 42,275 sockeye were taken by the Indian fishery in 1947; an increase of 38% more fish than taken in 1943.

Sockeye were again tagged at Sooke on the south end of Vancouver Island in order to obtain further information on their movements through the commercial

fishing areas and on to the spawning grounds. During the 1947 season a total of 3,447 tags were released of which 2,878 fish were tagged between June 30 and August 18 while fishery for sockeye was closed.

Study of the selectivity of the gill net fishery was undertaken by the Commission in 1947. Two chartered boats fished during the two or three day weekly closure using a net of 200 fathoms in length but composed of five sections, each of different mesh size and forty fathoms long. A complete range of samples was obtained for nets between 5¼-inch and 8¾-inch mesh. Although analysis is yet incomplete, the results do show the validity of the 8-inch minimum mesh prescribed by the Commission for use during the closed sockeye season.

In 1947 the Commission began its programme to restore the sockeye runs to the Quesnel area. For the past several years a careful study has been made of the biological and physical characteristics of the various spawning streams. It was found that conditions in the upper Bowron River most nearly agreed with those of the Horsefly River—the major spawning stream in the Quesnel system. Consequently, between August 15 and September 17, 750,000 eggs were taken from the Bowron run and developed to the “eyed” stage. Through co-operation with the State of Washington, the eggs were transferred by air to the State Hatchery at Marblemount and the University of Washington at Seattle. Here the eggs will be hatched and the young reared until released in the Quesnel system in 1948.

A “high-level” fishway was completed on the right bank at Hell’s Gate in May, 1947, so that the early runs were able to pass this year during high water without delay. The fishway is 150 feet in length with an inside width of 13 feet 8 inches, and is built parallel to but at a higher elevation than the main fishway. Both fishways operate between 53 and 54 feet but above 54 feet the right bank principal fishway will submerge and the high level structure will continue to operate to the approximate elevation of 70 feet.

As a result of biological and engineering investigations, an area of difficult passage for sockeye salmon was found to exist throughout the upper reach of Farwell Canyon on the Chilcotin River. In 1947 construction was begun on a series of five fishways that will eliminate the obstruction and allow the run to the Chilko area to pass without delay. The combined length of the fishways is 590 feet with a width of 6 feet. Use again is made of vertical baffles, but in contrast to the design of the larger structures at Hell’s Gate or Bridge River Rapids, only a single slot opening of 12 inches is placed in the fishways at Farwell. Pools 10 feet in length are located between the baffles which will allow ample room for the fish to rest while ascending the structure.

Engineering studies have been made of conditions at China Bar on the Fraser River 1½ miles above Hell’s Gate, and at the Canyon on the Thompson River six miles above Lytton. Both of these areas became obstructions to the migration of salmon during the extreme low water of 1946. However, further proof of actual mortality as well as other characteristics of the blockades must be obtained before steps will be taken for correction. The design for the Weaver Creek project has been completed and work will begin as soon as the necessary easements have been obtained.

The Commission met in Vancouver, B.C., on January 17-18; and in Bellingham, Washington, on April 2-4, on August 9-10 and on November 24-25.

The Canadian members of the Commission were Mr. A. L. Hager, Chairman; Mr. A. J. Whitmore; and Mr. Tom Reid, M.P.: while Mr. Edward W. Allen and Mr. Milo Moore served for the United States. On November 11, Mr. Fred J. Foster, United States Commissioner and Secretary, died suddenly. Mr. A. L. Day, Chief of the United States Fish and Wildlife Service, Washington, D.C., has been appointed to fill his place.



## SUMMARY REPORT OF INTERNATIONAL FISHERIES COMMISSION 1947

The regulation of the Pacific halibut fishery was continued by the International Fisheries Commission under authority of the convention of 1937 for the preservation of the halibut fishery of the Northern Pacific Ocean and Bering Sea. Investigations of the fishery and of the condition of the stocks of halibut were also continued to determine the effect of past regulations and to provide a sound basis for those of the future.

The regulations governing halibut fishing were reviewed and a few changes were made, following a meeting in the winter of 1946 with the Halibut Conference Board composed of representatives of the United States and Canadian halibut fleets. The revised regulations were approved by the Governor-General of Canada and the President of the United States and became effective on March 17. They were similar to those of the previous year, except for a redefinition of the boundary line between Areas 3 and 4 and the setting of a catch limit for the latter area in anticipation of a fishery for halibut developing there.

Convention waters were divided into five areas: Area 1A, south of Cape Blanco Light, Oregon; Area 1B, between Cape Blanco Light and Willapa Bay, Washington; Area 2, between Willapa Bay and Cape Spencer, Alaska; Area 3, between Cape Spencer and a line running true west from Cape Sarichef on Unimak Island; Area 4, the part of Bering Sea north of the Cape Sarichef line. The catch limits of 24,500,000 and 28,000,000 pounds for Area 2 and 3, respectively, were continued and a limit of 500,000 was placed on Area 4. Areas 1A and 1B were continued without catch limits.

Provision was made for the opening of the fishing season in all areas on May 1 and for the subsequent closures of each. The closure dates of Areas 2, 3 and 4 were made contingent upon the attainment of their respective catch limits, or in the case of Area 4 upon the earlier closure of Area 3. The closure date of Area 2 was applied to Area 1B and that of Area 2 or 3, whichever was later, was applied to Area 1A.

Other provisions of the regulations included: a minimum size limit of 26 inches heads-on or 5 pounds heads-off for halibut; the closure of two nursery areas, off Masset in northern British Columbia and off Timbered Islet in Southeastern Alaska; the prohibition of the use of dory gear and of nets of any kind for the capture of halibut; the termination of permits for the retention of halibut caught incidentally during fishing for other species in closed areas on November 16; and, the beginning of the winter closed season on December 1, if it had not already begun by reason of the earlier attainment of the catch limits.

The 1947 fishing season was the shortest in the history of the Pacific halibut fishery. Areas 2 and 1B were closed at midnight of June 8, with the attainment of the Area 2 catch limit. Areas 3, 4 and 1A were closed at midnight of August 17 when the Area 3 catch limit was taken.

Landings of halibut during 1947 amounted to 55,982,000 pounds. Of this total 511,000 pounds were taken in Areas 1A and 1B, 27,642,000 pounds in Area 2, 27,828,000 pounds in Area 3 and 1,000 pounds in Area 4. Landings were approximately 4,000,000 pounds less than in 1946, in which the Area 2 and Area 3 catch limits were greatly exceeded, due to unpredictable circumstances. However, landings were 1,300,000 pounds greater than in 1945 and exceeded in only one year since 1915.

The Canadian halibut fleet landed 24,084,000 pounds of halibut in 1947, an increase of approximately 5,500,000 pounds over 1936. It landed 17,130,000 pounds or 62 per cent of the Area 2 catch and 6,954,000 pounds or 25 per cent of the Area 3 catch. This sharp increase in the Canadian share of the landings resulted in part from an increase in the number of vessels, but mainly from the almost complete cessation of fishing by the Seattle section of the United States fleet during May and June as a result of a dispute between the vessel owners and fishermen.



As in other years, the Commission maintained close contact with all branches of the fishing industry during the fishing season. At the request of the fleets, its meeting with the Halibut Conference Board, previously held in November or December to consider matters pertaining to the regulation of the fishery, was moved forward to the early part of January, 1948. The time of the Commission's annual meetings was altered to correspond.

Scientific investigations, which provide the information necessary for the rational control of the fishery, were continued by the Commission's staff. Current statistical and biological data, showing the changes in the fishery and in the condition of the stocks of halibut, were collected and analyzed. The collection of biological materials and data made the operation of a vessel necessary.

The abundance of halibut, as indicated by the average catch per standard unit of fishing effort, was 2 per cent above the 1946 level in Area 2 and in Area 3. It is 144 per cent greater in Area 2 and 89 per cent greater in Area 3 than in 1930, in which the stocks of halibut reached an all time low. In Area 2 the catch per unit of effort was higher than in any year since 1915. In Area 3 there was a small improvement which partially offset the moderate decline that occurred in 1945 and 1946.

The changes taking place in the size and age composition of the stocks of marketable halibut under regulation were studied by sampling the catches of commercial fishing vessels. Approximately 9,000 halibut were measured from Area 2 catches and materials for the determination of age were taken at the same time from 1,600 of these. The short season and an abnormal distribution of landing, resulting from the tie-up of the Seattle halibut fleet, reduced the number of samples.

Analysis of the market measurement data showed that "chicken" halibut, from five to ten pounds in weight, were less numerous in 1947 than in the preceding three years but made almost as great a contribution to the catch because of their greater average size. "Medium" halibut, weighing from 10 to 60 pounds, were more numerous than in any recent year and more than offset the reduction in the catch of chickens. "Large" halibut, over 60 pounds, constituted a normally insignificant part of the catch.

Age composition studies revealed that the reduced numbers of chickens in the Area 2 catch during 1947 were caused by a low production of young in the 1939-40 spawning season, or by a low survival of the young from that spawning in the years preceding their entry into the fishery. Older halibut, derived from the four spawnings immediately preceding that of 1939-40, were above average in number. A continuance of the current high level of abundance during the following fishing season was indicated.

Investigations of the otter trawl fishery for other species on important halibut grounds between the northern end of Vancouver Island and Dixon Entrance, begun in 1946, were continued to ascertain the effect that this fishery might be expected to have upon the stock of halibut in Area 2. The otter trawl vessel *Santa Maria I* was chartered and operated for five weeks in May and June for this and other purposes.

During the trawling operations, a total of 78 hauls were made on recognized halibut grounds, using commercial trawls. Extensive data were collected concerning the numbers and sizes of halibut caught on different grounds, the distribution of small unmarketable halibut and the mortality of halibut caught by trawl under various conditions. Biological material for age, growth and maturity studies were collected. Approximately 3,500 halibut were tagged and released for the determination of migrations and the study of natural and fishing mortality rates.

Analysis of the data collected during trawling operations in 1946 and 1947 showed that trawl catches of halibut vary greatly in amount and composition from ground to ground and even from one part to another part of the same ground. Trawls of the mesh used commercially on the Pacific Coast catch a much higher

proportion of small unmarketable halibut than does the long-line gear used in the halibut fishery. The mortality of trawl caught halibut varies directly with the total catch of all species in the individual hauls, ranging from practically zero in small catches to almost 100% in large catches. Results indicated that indiscriminate trawling on halibut grounds would be injurious to the stocks of halibut and to the Commission's conservation program.

A study of the nature of the halibut stocks in the Bering Sea region was begun. A biological observer was placed upon a trawler making a two-month exploratory crab-fishing trip to that region. The catch of halibut in Bering Sea was very small, suggesting the presence of a very limited supply there. Halibut of marketable size, 287 in number, were tagged and released alive to study their migrations and to ascertain whether the stock in the Bering Sea is a part of or independent of the stock to the south of the Alaska Peninsula.

Members of the Commission were, as at the end of 1946: Mr. G. W. Nickerson and Mr. A. J. Whitmore for Canada; Mr. Edward W. Allen and Mr. Milton C. James for the United States. Mr. Allen served as Chairman and Mr. Nickerson as Secretary.











Zool.

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